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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

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ISRAELI CARP FOR CONTROL OF AQUATIC WEEDS IN PONDS

The use of Israeli carp as a means of controlling aquatic weeds in ponds has been under investigation by the U. S. Bureau of Sport Fisheries and Wildlife.

At the Fish Farming Experimental Station at Stuttgart, Ark., Israeli carp were stocked at rates of 12, 20, and 50 per acre in 12 ponds which contained various combinations of other fish. Throughout the growing season of 1963, troublesome amounts of vegetation did not appear in any of those ponds.

One experiment involved a group of 8 ponds, of which 4 were stocked with Israeli carp and 4 were not. All those ponds had growths of filamentous algae, but the algae became a problem only in the 4 ponds that did not contain the Israeli carp. (The Progressive Fish-Culturist, January 1965.)

Editorial Assistants: Ruth V. Keefe and Jean Zalevsky

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* * * * *

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THE ATLANTIC TUNA FISHERIES, 1963[1/]

By Richard S. Shomura*

ABSTRACT

The Atlantic landings of tunas and bonitos increased threefold from 1956 to 1963. In 1963, the total Atlantic catch was estimated at 257,600 metric tons. The increase can be traced to the expansion and modernization of the older tuna fisheries and the development of new fisheries. The latter category includes the African surface fishery, Northwest Atlantic purse-seine fishery, and the Japanese Atlantic long-line fishery.

The present report summarizes the recent trends in landings of the commercially important tuna species in the Atlantic, describes the statistics on landings and the fishing methods employed in the various tuna fisheries, and presents an initial attempt to assess the magnitude of the Atlantic tuna resources by comparing the Atlantic landings with Pacific landings.

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Tunas support one of the most widespread and most rapidly growing fisheries in the world today. In 1948, the total world catch of tunas, including bonitos, was 308,450 metric tons.[2/] The largest portion of the catch came from coastal waters, and only in the Pacific did the range of the fisheries extend far beyond the immediate shores. Since 1948 new tuna fisheries have developed, old ones have undergone modernization and expansion, and the landings of tunas and bonitos[3/] have quadrupled. About 1.25 million tons were landed in 1963.

In recent years a large part of this growth took place in the Atlantic Ocean. The total catch of tunas and bonitos from the Atlantic was 81,400 tons in 1956. By 1963, only 7 years later this take had more than tripled to 257,600 tons.

Although some of the growth in the Atlantic can be attributed to modernization and expansion of the older fisheries, the largest increase came from three new fisheries--the Japanese Atlantic long-line fishery, the African surface fishery, and the Northwest Atlantic purse-seine fishery.

Descriptions of some of the tuna fisheries in the Atlantic are available, and some analytical studies have been carried out. Wilson (1965) described the development of the Northwest purse-seine fishery. Lima and Wise (1963) analyzed data from the long-line fishery off South America. For the eastern tropical Atlantic, LeGuen, Poinsard, and Troadec (1965) re-

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1/An earlier draft of this manuscript was distributed as a background paper for the Second Session of the FAO Working Party for the Rational Utilization of Tuna Resources in the Atlantic Ocean.

2/All weights presented in this report are in the metric system unless stated otherwise. A metric ton equals 2,205 pounds.

3/Includes species listed under the category of Tunas, Bonitos, Skipjack in the FAO Yearbook of Fishery Statistics (FAO 1964).

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viewed the surface fishery off Pointe-Noire (Congo-Brazzaville). There is still, however, a lack of general information and statistics on the Atlantic tuna fisheries.

The objectives of this report are to: (1) present and discuss the recent trends in landings of the principal tuna species; (2) review briefly the major fisheries in the Atlantic with emphasis on newly developed fisheries; and (3) compare Atlantic landings with Pacific landings to gain some insight into the magnitude of the potential tuna resources in the Atlantic.

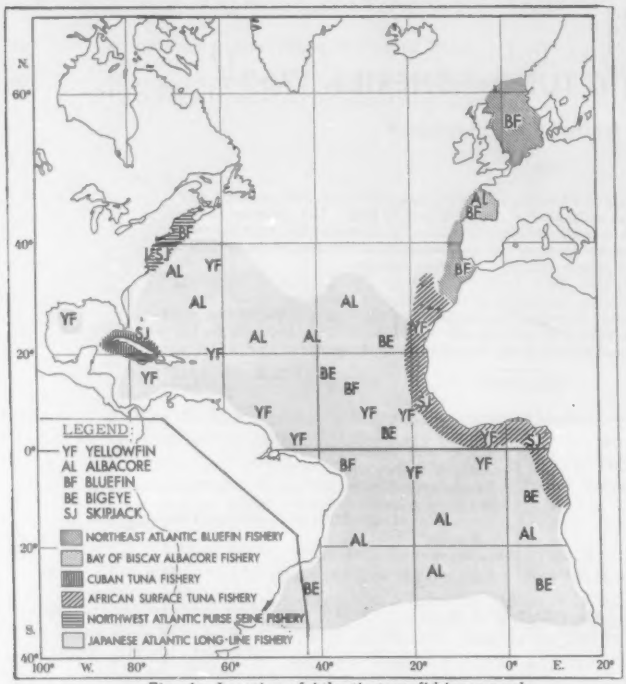

Fig. 1 - Location of Atlantic tuna fishing grounds.

This discussion is limited to the five species of tunas and tuna-like fishes considered to be of worldwide importance: yellowfin (Thunnus albacares), albacore (T. alalunga), bluefin (T. thynnus), bigeye (T. obesus), and skipjack (Katsuwonus pelamis). It is convenient to treat the Atlantic fisheries by area, as follows: (1) Northeast Atlantic bluefin fishery; (2) Bay of Biscay albacore fishery; (3) Cuban tuna fishery; (4) African surface tuna fishery; (5) Northwest Atlantic purse-seine fishery; and (6) Japanese Atlantic long-line fishery. Figure 1 shows the general location of these fisheries. The numerous subsistence fisheries located along the coasts of continents and islands are not discussed. Also omitted are fisheries for which information is not readily available from the literature, such as the pole-and-line fishery in the Azores Islands.

A brief description of the different methods of fishing discussed in this report may be appropriate. The four basic methods of tuna fishing in the Atlantic are pole and line, purse seine, long line, and traps.

The pole-and-line method is used in surface fishing and is also commonly known as live-bait fishing. Small fish are tossed into the midst of a tuna school to attract the tunas to the fishing boat. Fish are caught with barbless hooks attached to a length of line on a bamboo pole. Rawlings (1953) provided a good description of the method employed on a small scale in Cuba, and Godsil (1938) gave an excellent account of the large pole-and-line tuna fishery then operating out of California.

The purse seine also is employed for surface fishing. Here a large net is set around a school of tuna and by a "pursing" arrangement the bottom of the net is closed to prevent escape of the fish. After the net has been pursed the catch is brailed onto the fishing boat. McNeely (1961) gave an excellent description of the present purse-seine gear and method employed in the eastern Pacific.

The pelagic long-line gear was developed by the Japanese and is used to catch the large-size tunas and billfishes. The gear consists of a series of mainline sections suspended from the surface of the water by floats. Attached to the mainline at intervals are dropper lines with hooks baited with fresh or salted fish. The depth of fishing is variable and dependent on the length of line (mainline, float line, and dropper), the distance between buoys, and the prevailing currents. In most long-line fishing, however, the hooks are placed at depths of 200 to 700 feet. The gear is set in the early morning and is allowed to drift free of the ship. Haul-

ing is usually started in the early afternoon. A Japanese boat usually fishes about 2,000 hooks per day. The total length of long-line fished on one set may equal about 50 nautical miles. Shapiro (1950) reviewed the historical development of commercial long-line gear in Japan.

The traps used in tuna fishing along coastal waters of the Atlantic are described briefly in this paper in the section on the Northeast Atlantic bluefin fishery.

TRENDS IN TUNA LANDINGS, 1956-63

Landings of the five principal species of tuna from the Atlantic Ocean and adjacent seas[4/] for 1956-63 are shown in figure 2. In this and subsequent discussions on landings the reader is referred to comments on the availability and accuracy of world catch statistics (Chapman 1963). Chapman pointed out that "It is questionable whether the totals (landing figures) thus arrived at are closer than ten or fifteen percent of being accurate."

YELLOWFIN: Prior to 1956, the yellowfin tuna resources of the tropical Atlantic were not commercially exploited. FAO records (FAO 1960) show only 200 tons of yellowfin landed from the Atlantic in 1956, all by U.S. vessels. Undoubtedly, yellowfin were taken in subsistence fisheries located along the coastal waters of the tropical Atlantic. These catches were included, however, either in the totals of other species or were not reported to FAO. As the African surface fishery and the Japanese long-line fishery developed, the landings of yellowfin tuna steadily increased from 200 tons in 1956 to 74,700 tons in 1960. Catches declined somewhat in 1961 and 1962 but increased again in 1963. The decline in 1961 and 1962 was attributed to the relatively low yellowfin catches by the Japanese long-line fishery.

Although the contribution of the African surface tuna fishery to the total yellowfin catch has increased recently, most of the annual landings have come from the Japanese long-line fishery. In 1963, the Japanese fishery landed 55 percent of the Atlantic yellowfin catch.

ALBACORE: Albacore and bluefin tunas made up most of the Atlantic tuna catch prior to 1956. In 1956, albacore landings for the Atlantic were 37,700 tons. With the exception of a small quantity reported from Angola, all came from the important albacore fish-

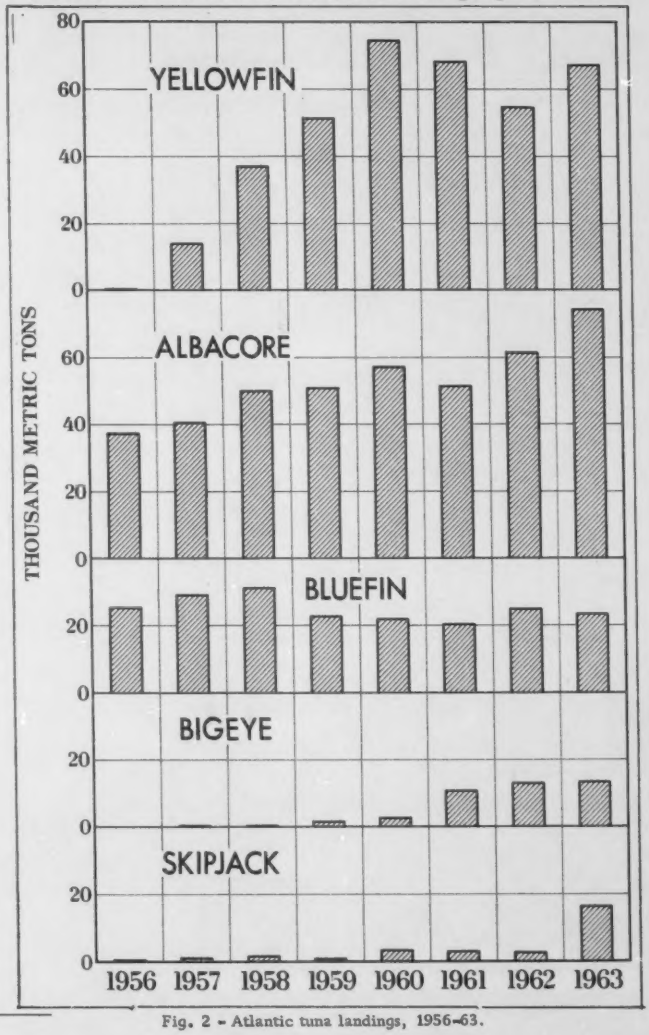

Fig. 2 - Atlantic tuna landings, 1956-63.

4/Excluding the Mediterranean Sea.

ery in the Bay of Biscay. From 1956 to 1963, the catch increased from 37,700 tons to 74,500 tons, principally due to the increased effort of the Japanese long-line fishery. The Japanese have increased their share of Atlantic albacore landings from about 2 percent in 1957 to 37 percent in 1963.

BLUEFIN: The Atlantic bluefin tuna landings increased from 25,200 tons in 1956 to a high of 31,100 tons in 1958, followed by a noticeable decline from 1959 to 1963. For 1959-63 the annual landings averaged 22,900 tons. From his examination of the long-term trends, K. Tiews (personal communication) reported that the recent landings were considerably lower than for the 1952-55 period, when the average annual bluefin landing for the Atlantic (excluding Mediterranean catches) was 33,000 tons.

The peak in 1958 was primarily due to the excellent catches in the Moroccan fishery, which landed 10,500 tons of bluefin tuna. The records (data provided by K. Tiews) indicate that the annual Moroccan catch did not exceed 4,900 tons in 1950-57 and has not exceeded 6,000 tons since the high in 1958.

The Japanese long-line catch of bluefin tuna has steadily increased from 0.3 percent of the total Atlantic catch in 1957 to approximately 32 percent in 1963.

BIGEYE: Until the Japanese began fishing the high seas of the tropical Atlantic Ocean, bigeye tuna were taken only occasionally and were often confused either with blackfin (Thunnus atlanticus) or bluefin tuna (Mather and Gibbs 1958). The deep-fishing gear used by the Japanese revealed a sizable resource of large-size bigeye tuna in the Atlantic.

Although figure 2 does not show a bigeye catch for 1956, small quantities of small bigeye tuna were probably caught with surface fishing gear. Bigeye landings have increased from 500 tons in 1957 to 13,300 tons in 1963, nearly all taken by the Japanese long-line fishery.

SKIPJACK: Prior to 1963, only a negligible amount of skipjack tuna was landed from the Atlantic. From 1956 to 1962, the highest landings reported were 3,300 tons in 1960. In 1963, the catch increased suddenly to 16,700 tons, principally taken by the Northwest Atlantic purse-seine fishery and the African surface tuna fishery. It is generally believed that this resource could support a much larger catch.

OLDER ATLANTIC TUNA FISHERIES

The older tuna fisheries have been in existence for a long time. Information is available from so many sources, that the status of these fisheries need be reviewed only briefly.

NORTHEAST ATLANTIC BLUEFIN FISHERY: Countries and size of catch in 1963 were:

Country	Metric Tons	Country	Metric Tons
Norway	100	Portugal	400
Germany	Less than 100	Spain	7,900
Denmark	Less than 100	Morocco	1,500
Sweden	No catches listed	France	500

Hamre and Tiews (1962) reported that bluefin tuna caught off the Norwegian coast and those taken in the central waters of the North Sea by German fishermen come from the same stock. In Norway tuna fishing is carried out by the two-boat purse-seine method, introduced in 1946. The center of the fishery is off Bergen, Norway, and the bulk of the bluefin catch is made within 30 miles of land. The season extends from mid-July to September, with August the peak month. The size of fish ranges from 300 to 800 pounds.

Danish, Swedish, and German fishermen use the hook-and-line method of fishing (Tiews 1963). In the German fishery five or six hooks are fished from each boat. Each hook is baited with a fresh fish (herring, mackerel, or whiting) and is positioned at a predetermined depth, usually 20-25 meters (66-82 feet), depending on the length of dropper line attached to a float.

The gear is then allowed to drift free of the boat. The season for this fishery extends from mid-August to the end of October. The size of tuna caught ranges from 400 to 700 pounds.

In the lower latitudes of the Atlantic, bluefin tuna are taken mostly by traps operated along the coasts of Spain, Portugal, and Morocco. These traps are large rectangular nets which extend from shore out into the sea. The entire fishery depends on movement of the bluefin along the coasts during their seasonal migration. In Spain the fishing season extends from May to mid-August. The average size of bluefin taken exceeds 250 pounds.

In addition to the trap fishery, bluefin are taken in commercial quantities by troll gear off Portugal. The pole-and-line method with small fish as bait is used by French fishermen in the Bay of Biscay from June to August. Bluefin tuna taken in the Portuguese fishery are small, ranging from approximately 6 to 30 pounds. Those taken in the Bay of Biscay fishery are larger, from 15 to 75 pounds.

BAY OF BISCAY ALBACORE FISHERY: Countries and size of catch in 1963 were: Spain - 28,300 tons, and France - 14,400 tons.

Until the mid-1950's, the Bay of Biscay albacore fishery was the largest single tuna fishery in the Atlantic. Albacore landed by France and Spain totaled 35,700 tons in 1956, which represented approximately 56 percent of the total Atlantic landings of the five principal species discussed in this paper. In 1963, although the Bay of Biscay albacore catch had increased to 42,700 tons, this take represented only 22 percent of the total Atlantic catch of the five principal species.

Very little information is presently available on the Bay of Biscay albacore fishery. Until 1946, albacore were caught only by trolling. In 1947, the French introduced the pole-and-line method (Postel 1963). Although the French were recently reported to be experimenting with purse seines, the pole-and-line system is still the principal method of fishing. Information on the results of the purse-seine experiments is not yet available.

The albacore season extends from June to November. The fish first appear off the northwest coast of Spain in June (Postel 1963). In July they migrate into the Bay of Biscay, move offshore and to the northwest in August and September, return to the Bay of Biscay in October, and leave the bay in November.

Albacore taken by the Bay of Biscay fishery are small. The largest of three size groups is less than 25 pounds.

NEWER ATLANTIC TUNA FISHERIES

Development of new fisheries in the middle 1950's brought to the Atlantic the same mobility that characterizes some Pacific tuna fisheries. Today the Japanese long-line fishery covers a large part of the Atlantic. Tuna boats from Spain, France, Portugal, and the United States travel great distances to fish off West Africa. These newer fisheries merit detailed discussion.

CUBAN TUNA FISHERY: The catch of the early 1950's was about 1,500 tons of skipjack and blackfin tunas.

A small pole-and-line fishery for skipjack and blackfin (Thunnus atlanticus) tunas was first developed in Cuba in 1940 (Rawlings 1953). In 1956 the tuna fleet consisted of 18 boats. This fishery is coastal, mostly within 15 miles of shore. Skipjack make up 75 percent of the catch off the north coast but only 25 percent off the south coast. The average size of fish for both species was reported to be about 3 pounds.

In addition to the live-bait fishery, Cuba now has a small long-line fishery (Buesa 1964). The state-operated fleet presently consists of five long-liners which were built in Japan. In 1963, the total catch was 2,088 tons; presumably tunas made up the bulk of the take.

AFRICAN SURFACE FISHERY: Countries and size of catch in 1963 were:

Country	Yellowfin	Skipjack
	(Metric Tons)	
France	8,800	2,200
Spain	6,600	2,200
Japan	2,200	2,200
Portugal	1,100	-

Until 1955 yellowfin and skipjack tunas were taken only in small quantities by subsistence fisheries located along the coast of Africa and the coastal waters of the offshore islands. In late 1955, six pole-and-line fishing tuna boats from France began fishing off Senegal. They were successful in catching commercial quantities of tuna in these waters and returned the following season. The fishery has grown since its modest start in 1955, and the fleet in 1963 was reported to consist of 90 French, 50 Spanish, 7 Japanese, and a few Portuguese tuna boats. In addition to yellowfin and skipjack, small quantities of bigeye tuna are also landed by this fishery. The increase in fishing intensity was accompanied by a geographical expansion of the fishery as far south as Angola. In the initial stages of development, the fishery off Senegal was seasonal, from October to February. Expansion of fishing grounds towards tropical waters extended the fishing season.

Presently the African tuna fishery is a pole-and-line operation. Recently several attempts have been made to introduce purse seines, but this method, so successful in the eastern Pacific, has thus far failed in the African fishery. In late 1964, Japan sent a purse-seine team to Africa to try two-boat purse seining, reportedly without much success.

NORTHWEST ATLANTIC PURSE-SEINE FISHERY: Bluefin tuna occur seasonally along the Atlantic coast of the North American continent. This species long has been the basis of a small fishery in the New England area. Along the Maine coast bluefin are taken by harpoon; off Massachusetts this species is taken by hook and line in the northern sectors and by traps in Cape Cod Bay. Prior to development of the purse-seine fishery, the catch averaged about 800 tons per year.

Wilson (1965) has documented the development of the Northwest Atlantic purse-seine fishery. The present discussion will be limited, therefore, to the results of the 1964 fishing season and some general comments on the fishery.

Purse seiners from the eastern Pacific tuna fishery first appeared in the Atlantic in 1962 and caused several changes in the fishery. Prior to 1962, fishing was restricted to Cape Cod Bay and the adjacent coastal waters, and the catch consisted almost entirely of bluefin. The greater capabilities of the larger purse seiners led to extension of the fishing area farther offshore, and the discovery of commercial quantities of skipjack. In 1963, skipjack made up 35 percent of the total tuna catch of 8,281 tons (Wilson 1965). In 1964, skipjack became the predominant species in the landings and made up 55 percent of the total of 9,810 tons.

Countries and size of catch in 1964 were:

Country	Skipjack	Bluefin
	(Metric Tons)	
United States	5,000	4,000
Canada	360	450

In 1964, the tuna fleet operating in the Northwest Atlantic consisted of 13 medium and large purse seiners which normally fish in the eastern Pacific, 6 small purse seiners based in New England, and 2 small purse seiners from Canada.

Medium and large purse seiners fished an aggregate of 521 days in 1964 and made an average daily catch of 13.8 tons. By species, 7.8 tons of skipjack and 6.0 tons of bluefin were caught per fishing day. The season generally extends from June to September and covers the Continental Shelf from the Gulf of Maine to Cape Hatteras.

The size of bluefin taken by the purse-seine fishery varies from 60 to over 200 pounds. Skipjack tuna range from 5 to 15 pounds; the majority weigh from 5 to 7 pounds.

JAPANESE ATLANTIC LONG-LINE FISHERY: Size of catch in 1963 was:

	Metric Tons		Metric Tons
Yellowfin	35,000	Bluefin	7,400
Albacore	27,700	Bigeye	13,300

The Japanese long-line fishery started in the Atlantic with an exploratory cruise by a research vessel off the coast of South America in December 1955 (Nakagome and Suzuki 1963). On the basis of this and several other successful exploratory cruises in 1956, the Japanese commercial fleet began fishing in the tropical Atlantic in 1957. Despite the great distance from Japan to Atlantic tuna fishing grounds, the progressive increase in fishing effort and landings attest to a highly successful fishery.

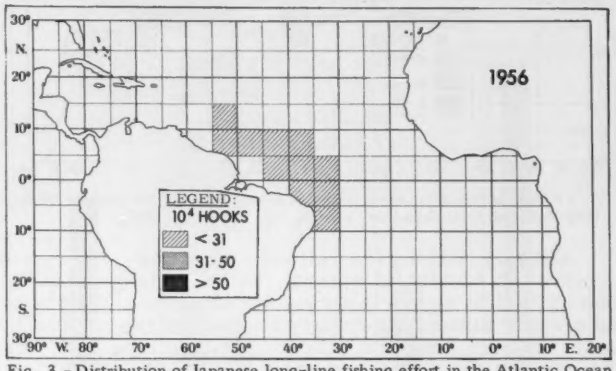

Fig. 3 - Distribution of Japanese long-line fishing effort in the Atlantic Ocean, 1956--adapted from Shiohama, Myojin, and Sakamoto (1965).

Development and expansion of the Japanese long-line fishery are shown in figures 3, 4, and 5. Fishing was restricted in 1956 to the western Atlantic off South America. By 1958, the long-line fishery had extended throughout the tropical Atlantic from South America to Africa. Effort was generally confined to the area between the Equator and latitude 10° N. By 1962, the area of operation had expanded as far as latitude 30° N. and 30° S.

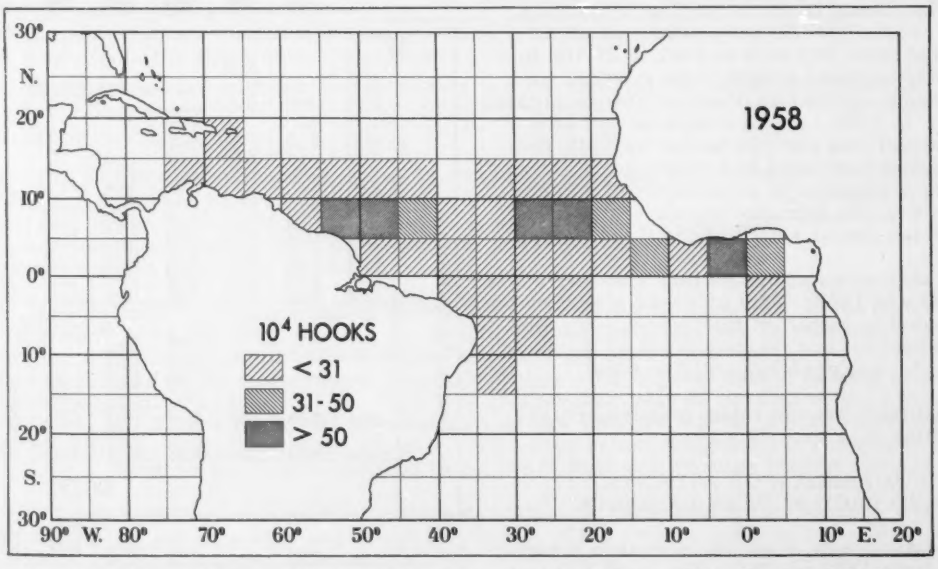

Fig. 4 - Distribution of Japanese long-line fishing effort in the Atlantic Ocean, 1958--adapted from Shiohama, Myojin, and Sakamoto (1965).

Figure 6 shows the trends in effort from 1956 to 1962 and the changes in fishing success. Only 136,000 hooks were fished in the Atlantic in 1956, primarily by research vessels operating in the western Atlantic. By 1962, total effort had increased to 54,340,000 hooks, representing approximately 27,200 boat-days. The lower panels in figure 6 show general trends in catch per unit of effort for the three principal species (yellowfin, albacore, and bigeye). The most striking feature is the sharp drop in catch rates for yellowfin--from an average of 7 to 9 fish per 100 hooks in 1956-58 to less than 2 per 100 hooks in 1962. In terms of tonnage these rates represent a drop from 7 tons to $1\frac{1}{2}$ tons per fishing day. One would strongly suspect a decrease in stock size, although the change could be attributed in part to a shift in fishing grounds.

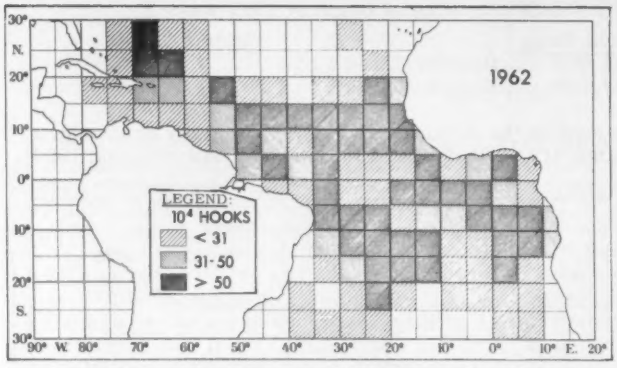

Fig. 5 - Distribution of Japanese long-line fishing effort in the Atlantic Ocean, 1962--adapted from Shiohama, Myojin, and Sakamoto (1965).

Initially, fishing for yellowfin tuna was centered in equatorial waters. Later, fishing was shifted to higher latitudes for albacore. As already stated, the fishery started off the coast of South America, moved eastward to the African coast, then expanded north and south. Although a detailed study has not been made of this shift in effort, it is likely that the good albacore catches in temperate waters caused a shift of a large part of the total effort away from the yellowfin grounds. The trend of the albacore catch, which increased from 900 tons in 1957 to 27,700 tons in 1963, suggests a shift from tropical to temperate waters, as does the change in catch rates. In 1956, albacore were caught at a rate of 0.8 fish per 100 hooks; by 1962, this figure had increased to 2.0 fish per 100 hooks. Unless abundance or availability of albacore increased, the increase in catch rates must have been due to a shift of the fishery.

Catch rates of bigeye tuna also increased in 1961 and 1962. This increase also may be attributed to a shift of the fishery. Bigeye, like albacore, are temperate-water tunas. Yellowfin are predominantly tropical.

Skipjack are not taken in commercial quantities with long-line gear.

COMPARISON OF ATLANTIC AND PACIFIC TUNA LANDINGS

Atlantic tuna landings increased substantially from 1956 to 1963. The catch became sufficiently large to raise questions about the size of the resource and its ability to sustain a large yield. For an evaluation of the east-

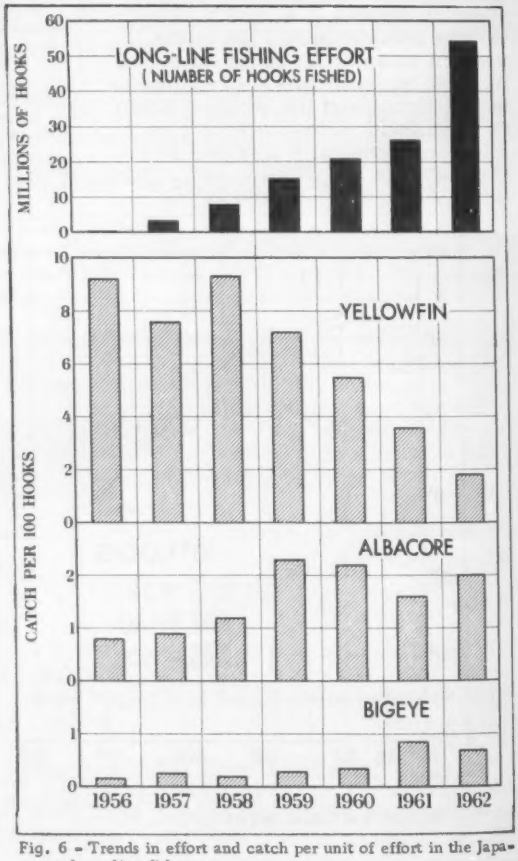

Fig. 6 - Trends in effort and catch per unit of effort in the Japanese long-line fishery.

ern Pacific yellowfin stock, Schaefer (1957) required detailed catch and effort data covering a number of years. Such data are presently not available for the Atlantic tuna fisheries. By accepting several general assumptions and by comparing landings made in the Atlantic and Pacific, a rough estimate of the magnitude of the Atlantic resource can be obtained. The following basic assumptions were made:

1. Tuna resources of the Pacific, except for yellowfin in the eastern tropical region, have not been overexploited. Therefore, landings of the five principal species in the Pacific for 1962 probably were less than the maximum sustainable yield of the Pacific stocks as a whole.

2. Environmental conditions in the two oceans are similar, as far as the tunas are concerned.

The present discussion is general and speculative. Hence, the figures for the ocean areas refer to the entire ocean. No attempt has been made to correct for variations in distribution of each tuna species. Sverdrup, Johnson, and Fleming (1942) indicate the size of the Pacific as 165,246,000 km.^{2} and the Atlantic as 82,441,000 km.^{2}. The Atlantic is approximately 50 percent the size of the Pacific. Thus, we can assume that the potential yield of the Atlantic resource is 50 percent of the yield from the Pacific.

Figure 7 shows annual landings of the five species from the Atlantic in 1963 and the Pacific in 1962. On the basis of the assumptions made, the following comparisons and estimates can be made from the catch data:

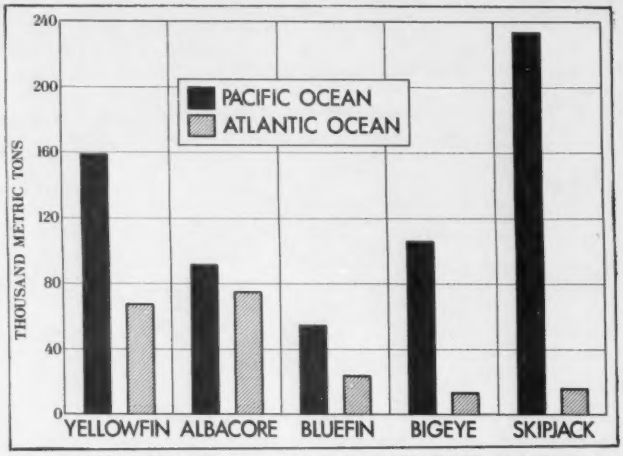

Fig. 7 - Landings of five tuna species from the Pacific (1962) and Atlantic (1963).

1. Exploitation of yellowfin in the Atlantic has not reached the same level as in the Pacific. The Atlantic catch of 67,400 tons represents about 42 percent of the Pacific landings of 159,100 tons.

2. The Atlantic albacore landings of 74,500 tons represent approximately 82 percent of the Pacific landings of 91,300 tons. On the basis of area, albacore are being caught at a greater rate in the Atlantic than in the Pacific. The Atlantic landings have exceeded the estimated minimum potential yield; it is possible, however, that the albacore resource in the Pacific has not yet been fully exploited.

3. The Atlantic bluefin landing of 23,400 tons in 1963 is approximately 43 percent of the Pacific landing of 54,600 tons; the Atlantic bluefin catches probably can be increased. As pointed out in the discussion of this species, however, the landings of earlier years (1952-55) exceeded those of the more recent years (1959-63). The highest annual landing since 1950 was 36,400 tons landed in 1955. This take is approximately 67 percent of the 1962 Pacific landing. F. Mather (personal communication) has obtained a high rate of return of tagged bluefin tuna in the Northwest Atlantic. This high return suggests the possibility of overfishing. Whether the bluefin stock is being overfished will require further research.

4. Atlantic landings of bigeye tuna were considerably less than in the Pacific. The Atlantic catch of 13,300 tons was only about 12 percent of the Pacific catch of 106,000 tons. The fishery for bigeye in the Atlantic probably is not taking the maximum potential yield.

5. Skipjack represent the largest undeveloped tuna resource in the Atlantic. Since the magnitude of the Atlantic landings of yellowfin and bluefin tunas are comparable to Pacific landings per unit area, it seems unlikely that there are limiting factors in the Atlantic which would make for a relatively small skipjack resource in this ocean. The Atlantic skipjack catch of 16,700 tons represents only 7 percent of the total Pacific landing of 234,100 tons. Atlantic skipjack catches must increase sevenfold to correspond, area for area, to Pacific landings. The Atlantic skipjack fishery should yield at least 117,000 tons. We might assume that this figure is a minimum estimate, for it is generally believed that skipjack in certain parts of the Pacific are still underexploited.

ACKNOWLEDGMENTS

A number of people provided data and advice on the material presented in this report. Mr. Robert C. Wilson, U. S. Department of the Interior, Bureau of Commercial Fisheries, Washington, D. C., provided information on the Northwest Atlantic purse-seine fishery and the African surface tuna fishery. Dr. K. Tiews reviewed an early draft of this manuscript and provided valuable information and data on the bluefin tunas of the Atlantic. Finally, my colleagues at the Nankai Regional Fisheries Research Laboratory in Kochi, Japan, and at the Fisheries Agency in Tokyo, Japan, assisted in the completion of the section on the Japanese long-line fishery.

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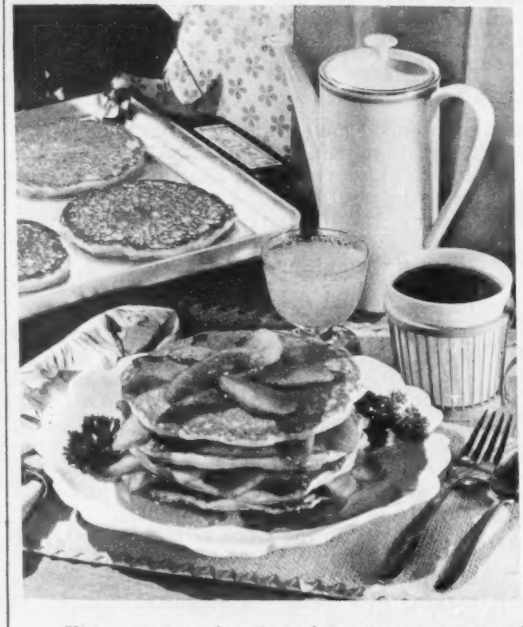
CLAM-CORN GRIDDLE CAKES



CLAM-CORN GRIDDLE CAKES

2 cans (7½-oz. each) minced clams
1½ cups sifted flour
1 cup yellow corn meal
5 teaspoons baking powder
1 teaspoon salt
1½ cups clam liquor and milk
2 eggs, beaten
⅓ cup melted fat or oil
Butter or margarine
Cran-applesauce

Drain clams, reserving liquor. Sift dry ingredients together. Add remaining ingredients except butter and Cran-applesauce. Stir only until blended. Drop ¼ cup batter onto a hot, well-greased griddle or fry pan. Fry 1 to 2 minutes or until brown. Turn carefully and fry 1 to 2 minutes longer or until brown. Serve with butter and Cran-applesauce. Makes approximately 18 griddle cakes. Serves 6.

CRAN-APPLESAUCE

1 can (1 lb.) jelled cranberry sauce
½ cup applesauce
¼ teaspoon cinnamon

Combine all ingredients and blend thoroughly. Chill. Makes approximately 2 cups sauce.

This recipe developed by home economists of the Bureau of Commercial Fisheries is from a 19-page, full-color, cookery booklet (Top O' the Mornin' with Fish and Shellfish, Test Kitchen Series No. 15) recently released by the Bureau of Commercial Fisheries, U. S. Department of the Interior. For 25 cents you can buy a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20240.

PACIFIC HAKE (MERLUCCIUS PRODUCTUS) AS RAW MATERIAL FOR A FISH REDUCTION INDUSTRY

By John A. Dyer*, Richard W. Nelson*, and Harold J. Barnett**

ABSTRACT

Pacific hake can be processed successfully into fish meal and oil with carefully selected equipment of conventional design for fish reduction. High efficiency in harvesting and processing this resource will be essential to a profitable operation.

INTRODUCTION

GENERAL: Pacific hake (Merluccius productus) has been found in commercial quantities off the coasts of California, Oregon, Washington, and British Columbia. This fact can be important to the Pacific Coast fish-reduction industry which has been reduced to a small fraction of its former size as the result of the decline in abundance of industrial species. The need to establish a productive hake fishery is emphasized even further by the fact that United States imports of fish meal have increased from 45 to 210 percent of domestic production in the past 5 years.

The Department of the Interior's Bureau of Commercial Fisheries is cooperating with the fishing industry in trying to fill this need. Development work with midwater trawl methods and equipment, and extensive but still incomplete survey work on the hake population, conducted by the Bureau's Exploratory Fishing and Gear Research Base at Seattle[1/], are beginning to provide a basis for a revived fish-reduction industry on the Pacific Coast. This report is an evaluation of what has been learned to date of the possibilities for Pacific hake for reduction by present commercial methods and supplying the existing markets for fish meal, oil, and solubles.

PACIFIC HAKE RESOURCE: Research on the potential hake fishery is being carried out jointly by the Bureau's Exploratory Fishing and Gear Research Base and the Bureau's Biological Laboratory at Seattle. Information is being sought on the extent of the hake resource, its productive capacity, optimum fishing periods, and the best fishing practices for maximum sustained yield. Preliminary surveys indicate that Pacific hake (Merluccius productus) are found in commercial quantity from Baja California, Mexico, to British Columbia, Canada. Intensive but limited surveys off the coasts of Washington and Oregon in 1964 found some schools of hake numerous and large enough to sustain a fish-reduction industry of modest size. Available schools are defined for this article as being those found at depths of 40 to 60 fathoms that can be fished successfully with the Cobb pelagic trawl. The hake off Washington and Oregon appear to school sufficiently for commercial fishing from May or June through October or November, making this fishery a potential summer and fall operation.

Fig. 1 - Hake from Puget Sound being unloaded by pump.

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1/"Construction and Operation of Cobb Pelagic Trawl--1964," by Richard L. McNeely, Leonard J. Johnson, and Charles D. Gill, Commercial Fisheries Review, October 1965, pp. 10-17 (also Separate No. 743.)

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 763

Large populations of hake are found to spawn off the coast of California in much deeper water. This apparently greater potential hake fishery off California is not included in this report since the required summer and fall surveys have not been made and the combination of effective gear and methods for harvesting has not been determined.

UTILIZATION: The possibility of using Pacific hake in both food and nonfood products has been the object of some preliminary investigation by the Bureau's Technological Laboratories at Seattle (Washington) and College Park (Maryland). The products being considered are fresh or frozen fillets, frozen blocks of fillets, pet food, mink food, fish protein concentrate, and industrial products (fish meal, oil, and solubles). Since markets for the industrial products are established and strong at this time and, in our judgment, the meal, oil, and solubles from hake could be established in these markets in a sho.' time, our first effort is in the direction of reduction.

HAKE REDUCTION

The reduction of Pacific hake into fish meal, oil, and solubles is being investigated in cooperation with the fish-reduction industry in Oregon, Washington, and British Columbia. That area was chosen because of the large concentrations of hake found there to date in available schools and because a relatively complete cross-section of the existing types of commercial reduction plants that might process hake are located there.

PACIFIC HAKE (MERLUCCIUS PRODUCTUS) AS A RAW MATERIAL: The characteristics of Pacific hake as a raw material for reduction are shown by the proximate analyses in table 1. In 1964, the hake caught in spring and early summer were low in fat content, in the range from 1 to 3 percent. In the late summer and through the fall, the fat content rose to a range of 4.5 to 6 percent. At about the same time, the crude protein rose slightly from about 14 percent early in the season to about 15 percent in the fall. This same pattern appears to be developing in 1965. Judging from the current meager data on composition and availability, August through November would be the most profitable months for processing hake, based on the increased oil and protein content. The termination date would depend on the dissipation of the dense schools of hake in the late fall. A more comprehensive article on Pacific hake as a raw material is in preparation at the Seattle Technological Laboratory.

Table 1 - Proximate Analyses of Pacific Hake (Merluccius productus) Taken off the Coasts of Oregon and Washington

Season	Moisture	Oil	Protein	Ash
	(Percent)			
Spring 1964	81.5	1.5	14.3	3.2
Summer and Fall 1964	77.7	5.2	15.0	3.0
Spring 1965	80.3	2.4	14.0	3.2

Note: These data are seasonal averages based on 14 samples.

PROCESSING: Pacific hake can be converted to meal, oil, and solubles by conventional methods used for large-scale reduction of fish. This method is the wet-rendering process in which the fish are cooked by direct or indirect steam, pressed to remove oil and water, and the solid press cake dried in a rotary dryer. The mixture of oil and water removed after cooking is separated by centrifuging, and the water phase is evaporated down to 40 or 50 percent soluble solids (solubles). These solubles are added back to the press cake before entering the dryer.

Figure 2 shows a material balance approximating what one would expect in a conventional fish-reduction plant processing hake in the fall. In the spring and early summer, this chart would be altered by the lower fat content of the hake (around 2 percent) and the slightly reduced protein content. A typical operation on 1,000 pounds of the spring hake processed through the same plant would produce little or no oil and about 211 pounds of whole meal (solubles are dried as part of the meal) assaying 67 percent crude protein, 9.5 percent fat, and 10 percent moisture. This might permit the reduction of hake in the spring in a plant without equipment for removing oil. However, as the fat content of the hake rose above 2 percent, the fat content of the meal would rise above 10 percent. Consequently the meal would be degraded as an oily meal in the larger markets for fish meal. Equipment for separating, clarifying, and handling of oil is recommended for improvement of the meal quality and as a source of income from the oil.

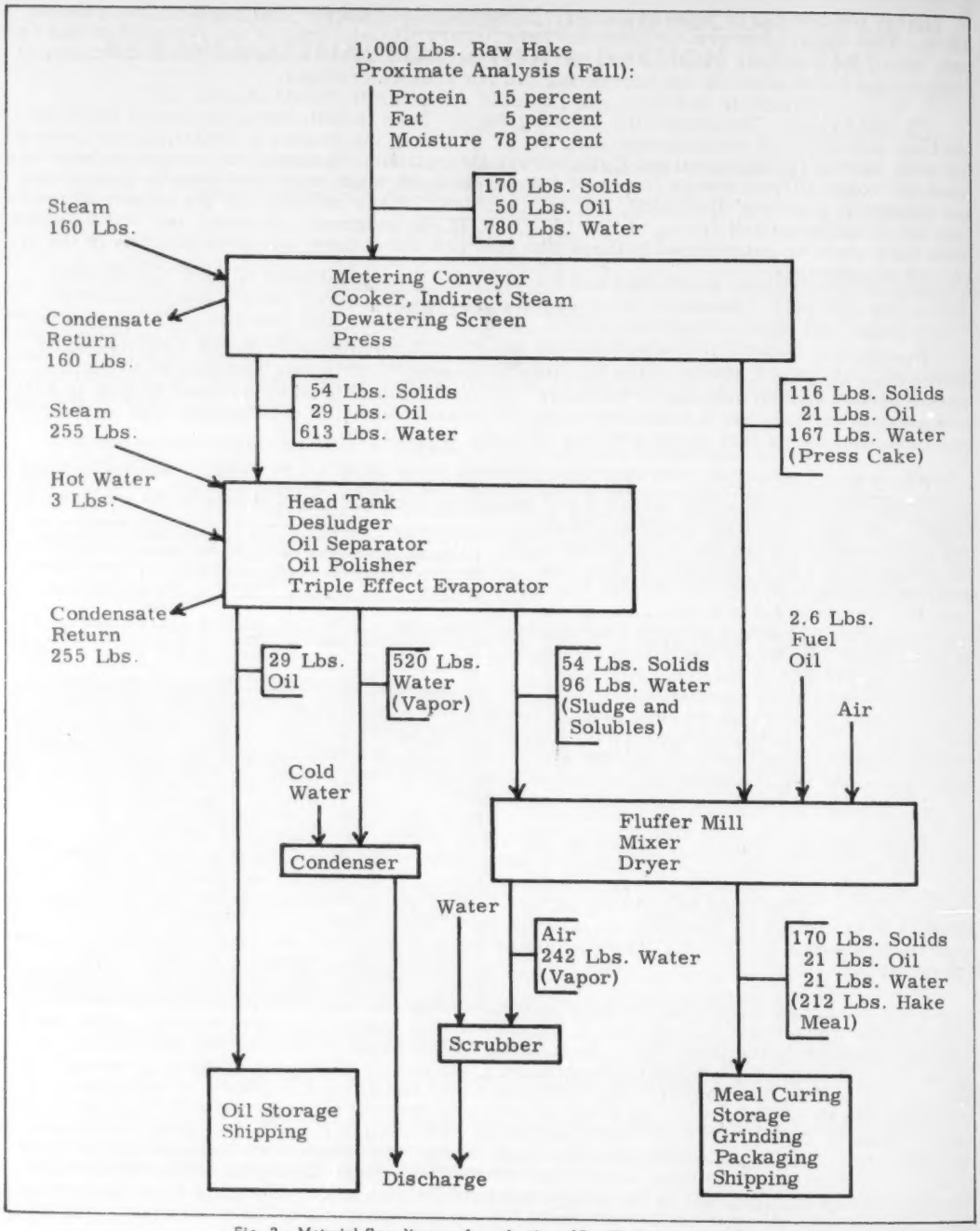


Fig. 2 - Material flow diagram for reduction of Pacific hake in the fall.

One characteristic of Pacific hake is its tendency to cook to a soft mushy consistency in an industrial cooker. This was a cause of concern on our part and led to a series of plant tests to evaluate the resultant problems in pressing and in processing in general.

COMMERCIAL PLANT TESTS: A series of cooperative plant tests have been run in three reduction plants in the Pacific Northwest with the hake being supplied by the Bureau's exploratory vessels. The amount of fish was too small in relation to plant capacity to produce reliable quantitative yield information. However, the information developed on process characteristics is included here because it is the best we have on Pacific hake.

Hake requires cooking at a lower temperature than is normal in fish reduction. Overcooking produces a press feed material of mushy consistency. This mushy material has a severe tendency to jam the press. Under even the best cooking and pressing conditions we have observed so far, the fish press cake has been pressed to a moisture content no lower than 63 percent. Thus we have much to learn before the cooked fish can be pressed down to a normal 50 to 55 percent moisture, or it may develop that hake is one of those species so difficult to press that a wetter press cake must be accepted. Certainly, any press equipment installed should be selected for maximum efficiency on moisture-retentive material and should have the best possible provision against jamming. Hake may present a challenge to the ingenuity of equipment manufacturers.

Another problem expected in production of hake meal will be the curing after drying. The iodine value of hake oil is high enough (around 160) to lead one to expect heating of the meal after drying. This heating may be severe enough to require special curing facilities such as equipment for addition of antioxidants and for turning and aerating the fish scrap. So far, none of the test runs have produced large enough volumes of meal to permit us to check this question.

The recovery of soluble protein from the press liquids is essential in the processing of hake. In the semiquantitative tests run so far, the proportion of fish solids found in the press water (stickwater) after desludging was about 22 percent of the solids content of the raw fish. This proportion will probably increase as press efficiency is improved. This represents too much of the raw fish to be lost. Also, recovery of solubles will eliminate a serious water pollution problem. The usual recovery system for solubles from press liquor, the triple effect evaporator, works well on acidulated stickwater from hake. With current market conditions, provision should be made for mixing the fish solubles back into the press cake ahead of the dryer for the production of "whole" meal. Oil-yield data were particularly unreliable in these tests because of the small percentage of fat in the relatively small plant runs. However, in one case where oil was not removed in a late summer test, the resultant meal assayed 21 percent fat. The conclusion is that the separation of oil is essential in such cases.

In general, the plant tests run to date indicate that conventional fish-reduction equipment carefully selected for application to the processing characteristics of hake will work reasonably well on hake reduction. Since hake is one of the more difficult fish to process, this same equipment should work well on herring, tuna scrap, sardine, and "scrap" fish. Although plant tests run so far have not been sufficiently quantitative to supply reliable yield data, the reduction products have been a source of reportable data.

HAKE MEAL: Whole meal and oil produced from Pacific hake in commercial reduction plants have been examined by this and other cooperating laboratories. The proximate analyses of the meal are shown in table 2.

The quality of the protein of Pacific hake meal was evaluated by the Bureau's Technological Laboratory at College Park, Maryland.

Table 2 - Analyses of Hake Meal from Plant Tests

Date	Proximate Composition			
	Moisture	Oil	Protein	Ash
	(Percent)			
September 1964	9.1	21.8	63.7	9.3
	5.4	15.0	68.7	13.4
October 1964	8.5	9.7	70.2	11.6
May 1965	9.2	10.2	65.0	18.1
	9.0	10.7	70.0	14.0
July 1965	7.1	13.5	67.5	15.3
	9.1	17.2	61.9	15.0

Note: Analyses were by the methods of the Association of Official Agricultural Chemists (1960).

They report that two samples from commercial plant test runs were fed to chicks on a comparative basis with four other proteinaceous materials of various qualities. The chicks were fed for 21 days on the test materials as a sole source of protein to supply a 15-percent level of protein in isocaloric diets in which calcium and phosphorus contents were kept constant at 1.50 and 0.88 percent, respectively.

Table 3 - 21-Day Chick Test Showing Protein Quality of Hake Fish Meals in Comparison with Different Fish Meals

Protein Test Material	Relative Growth Response	Average Body Weight
	Percent	Grams
Reference Protein Source No. 1 1/	100	354
Hake fish meal (B)	88	313
Fish meal "VP"	87	309
Hake fish meal (A)	81	286
Fish meal X	67	238
Reference Protein Source No. 2 1/	48	171

1/The reference test diets and the fish meal test diets reported here are special diets each containing 15 percent protein from a single source. Thus, the data in the table are useful in determining the relative quality of the fish meals with each other and with the reference standards. However, the data have no value in determining the relative quality of proteins from fish meal and proteins from cereals when added to a practical high-efficiency ration in which the proteins are from mixed sources. Reference Protein Source No. 1 was soybean meal with 0.3 percent methionine added; Reference Protein Source No. 2 was soybean meal.

Soybean meal with and without the addition of 0.3 percent methionine was used as a standard for indicating protein quality of the extremes--that is, the superior versus the inferior. In addition to the two hake meals, a sample of fish meal identified as "VP" was tested. These three products were less than 2 months old when tested. For comparison, another fish meal "X," which had been kept at ambient room temperature for 12 months, was also included in this test. The results showing the 21-day average weight obtained from 30 chicks for each of the test materials are listed in table 3. Since the soybean meal diet containing the addition of 0.3 percent methionine was expected to and did result in the maximum growth (354 grams), it was set arbitrarily at 100 percent. All other groups were rated on a relative growth basis. On such a relative rating scale, Hake Meal A is average for a fish meal while Hake Meal B is very good.

The protein fraction of three samples from test runs was assayed for amino acid composition. The results (table 4), show the ranges of concentrations found in these limited studies.2/

Solubles are produced from hake stickwater by conventional acidulation and multiple effect evaporation techniques. Since current economic factors dictate inclusion of the solubles in the whole meal, the solubles were not evaluated separately.

HAKE OIL: The oils produced to date from short-run hake reduction tests were dark reddish (number 12 or 13 on the Gardner '53 scale). Their iodine values have assayed around 160. Saturated fatty acids comprise from 26 to 33 percent and polyunsaturated fatty acids (with 4, 5, or 6 double bonds) comprise about 15 to 19 percent of the total fatty acids according to gas-liquid chromatographic analyses. These preliminary data indicate that the use of hake oil in organic coatings would be worth investigating.

Table 4 - Amino Acid Analyses of Protein from Pacific Hake Meal

Amino Acid	Percent Range 1/	
	Minimum	Maximum
Lysine	7.9	8.6
Histidine	2.0	2.3
Arginine	6.3	6.8
Aspartic acid	9.7	10.3
Threonine	4.1	4.5
Serine	4.0	4.1
Glutamic acid	14.3	14.8
Proline	4.3	4.9
Glycine	6.6	7.8
Alanine	6.1	6.7
Valine	5.0	5.5
Methionine	3.0	3.3
Isoleucine	4.5	4.9
Leucine	7.4	8.0
Tyrosine	3.1	3.7
Phenylalanine	4.1	4.4

1/Ranges from analyses of 3 samples of Pacific hake meal reported as percent of total protein.

ECONOMIC FACTORS

The economics of hake reduction should be considered in terms of spring and fall operations because of the change of chemical composition during the summer as discussed earlier. In the present early stage of our knowledge of the hake resource, the crude indications are that the hake school into fishable concentrations in May and disperse about November. The fat and protein content appear to rise through July and August and remain high through the rest of the season.

2/Correspondence from Dr. Donald Snyder, Department of the Interior's Bureau of Commercial Fisheries Technological Laboratory, College Park, Maryland.

A reduction ratio (weight of raw fish processed to the weight of whole meal produced) of about 5.5 to 1 appears to be commercially practical from well-drained hake throughout the year. With calculations based on the average prices over the past 8 years of $2.20 per ton unit of protein in the meal and 7.5 cents per pound for oil, a ton of spring hake should yield about 12.3 ton-units of protein at $27.10 and no oil. (We are aware of the higher prices for fish meal and oil at the time of this writing but do not recommend judging a long-term investment on the basis of spot prices, particularly during or after a period of a steep rise in price.) In the fall, a plant with a good oil extraction system and solubles recovery should yield about 12.7 ton-units of protein worth $28 and about 54 pounds of oil worth $4.05 for a total product value of $32.05. This low gross sales value of the products of reduction of a ton of hake calls for the utmost in efficiency and business management to cover sales and production costs such as brokerage fees; packaging; handling; plant operation and maintenance; unloading; amortization of plant equipment, building, and dock facilities; as well as a competitive price to the fisherman for the hake and, hopefully, some profit. Experimental fishing during the 1965 season indicates that like any other fishery, the hake fishery can have its lean periods. The size of the fishery is still open to conjecture, but based on the preliminary surveys by the Bureau's Exploratory Fishing and Gear Research Base, Seattle, and preliminary population studies by the Bureau's Biological Laboratory, Seattle, the schools of hake found off the coasts of Washington and Oregon are sufficient to support two reduction plants of 20-tons-per-hour capacity on a sustained yield basis. This estimate is subject to revision, since it is based on only five months of operation and an incomplete survey of the hake resource. However, this is the best information available at this early stage of the investigation.

SUMMARY

At the present stage we can see no great bonanza in a hake reduction industry; yet there is a good possibility for a paying operation. We have observed that a well engineered conventional fish-reduction plant will process hake in a satisfactory manner. This is still a pioneering period in which risk of capital is high. On the other hand, one waiting the years necessary for more complete development of information may find the fishery saturated with process capacity already established to or beyond the sustained yield potential. The only help we can give to management on whether and when to go into the hake-reduction business is for us to continue research where it is needed most, and to disseminate information as early as possible along with our evaluation of that information according to its stage of progress. Other considerations are: (1) the great hake populations off the coast of California at greater depths may become available through continued development of the midwater trawl techniques and more survey information; (2) research is underway on the evaluation of Pacific hake for the edible fish market in the forms of fresh fillets, frozen fillets, and frozen fish blocks; (3) considerable interest has been shown in hake by the manufacturers of frozen and canned animal foods; and (4) Pacific hake, because of its low fat content and excellent amino acid balance, is attractive as a source material for the manufacture of fish protein concentrate.

Any of the above potential uses for Pacific hake, if developed, could outbid the fish-reduction industry for the raw fish, so their progress should be watched. On the other hand, the market for fish meal and oil is here now and being supplied largely through imports; whereas, the other markets are either undeveloped or the suitability of hake for those markets is still in doubt. Consequently the reduction of hake into meal and oil would be the only route open into a seller's market at this time.

ACKNOWLEDGMENT

We wish to acknowledge the cooperation of members of the reduction industry in making the plant tests possible. The management and personnel of Bioproducts, Inc., Warrenton, Oregon; British Columbia Packers, Ltd., Steveston, British Columbia; and Grays Harbor Rendering, Elma, Washington, made their plants and skills available to us for test runs and observations on commercial processing of hake. The staff of the Department of the Interior's Branch of Commercial Fisheries Technological Laboratory at College Park, Maryland, made the protein evaluations reported here.

TRENDS AND DEVELOPMENTS

Alaska

RECORD KING CRAB CATCH IN 1965:

The 1965 king crab catch in Alaska exceeded 130 million pounds, 50 percent more than the 1964 catch of 87 million pounds, according to the Alaska Department of Fish and Game. The ex-vessel value amounted to about $14 million and the primary wholesale value was more than $30 million.

Washing fresh-caught king crabs on the deck of a factoryship.

The Alaska king crab fishery is probably growing faster than any other segment of the United States fishing industry. Since 1954, the catch jumped from less than 9 million pounds to become the second most important species in the Alaska commercial fishing industry--second only to salmon.

In 1965, approximately 1,500 fishermen, more than 300 vessels, and an estimated 20,000 pots were engaged in harvesting Alaska king crab. Each season increasing numbers of the more efficient vessels appear in the fishery and most of them are capable of annually landing over one million pounds of king crab.

The two main fishing areas, Kodiak and the Alaska Peninsula-Aleutian Islands, were credited with landings of 75 million pounds and 50 million pounds, respectively, in 1965.

Kodiak Island has 11 king crab-processing plants operating at the present time. Seven of these plants are within the City of Kodiak and require an estimated 40,000 crabs each day to maintain full operation.

When king crab are canned or processed as frozen meat, 80 percent or more of the crabs' landed weight becomes waste. In 1965, over 100 million pounds of king crab shells and gurry were thrown away.

The disposal of growing quantities of crab shells and waste has created serious problems for shore-based processing plants. The City of Kodiak in particular is being faced with a serious pollution problem. Some method of converting this waste material into salable products would substantially improve the economic well-being of the king crab industry and avoid an expensive pollution abatement program.

* * * * *

KING CRAB WORKSHOP HELD IN ANCHORAGE:

On February 28, the U. S. Department of the Interior's Bureau of Commercial Fisheries Technological Laboratory sponsored the third king crab workshop in Anchorage. The unanimous consensus of industry representatives at the meeting was that grade standards are premature at this time because the industry itself is not "standardized" enough to take this step. Instead, it was agreed that an industry-wide specification would be prepared, possibly under the auspices of the King Crab Quality Control and Marketing Board.

Following the standards discussion, research progress and technological problems of the industry were discussed. Waste disposal was added to the list of technological problems facing the industry (bluing, other color problems, liveholding, moisture control, etc.).

Discussion at the king crab workshop also emphasized that shell stock is fast becoming the largest volume king crab product, and that poor quality is much too evident. Production of shell stock is a very simple process and quality defects are principally the result of

poor selection of crabs and poor workmanship--problems particularly suitable for solution by a Quality Standard and Inspection Service.

* * * * *

RECORD SHIPMENT OF KING CRAB LEAVES ALASKA:

The largest shipment of king crab ever to leave Alaska was put aboard the SS Chena in early March. Altogether there were 49 refrigerator vans--14 of crab meat and 35 in shell--and 11 vans of canned king crab in the load. The Chena loaded its cargo at Sand Point, Squaw Harbor and Kodiak. This is the second shipment of king crab valued in excess of $1 million to come out of Alaska. The former record load which arrived in Seattle in March 1965, consisted of 26 refrigerator vans of frozen and 6 vans of canned crab.

Alaska King Crab
(Paralithodes camtschatica)

California

STATE ACCEPTS IRON GATE SALMON HATCHERY:

Iron Gate Hatchery was turned over to the California Department of Fish and Game by the Pacific Power and Light Company in a ceremony on March 22, 1966, at the hatchery.

Construction of the hatchery, located on the Klamath River upstream from Hornbrook, has been completed and the installation is in the process of being staffed.

The hatchery was built by the utilities company to compensate for the salmon and steelhead spawning and nursery areas that were cut off when Iron Gate Dam was built. The California Fish and Game Department will operate it and operation and maintenance costs will be shared by the Department and the Company. (California Department of Fish and Game, March 19, 1966.)

Cans--Shipments for Fishery Products, January-December 1965

A total of 2,989,241 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-December 1965 as compared with 2,752,126 base boxes used during the same period in 1964. In 1965, there were increases in the U. S. canned pack of Maine sardines and Gulf shrimp.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area of 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.

Central Pacific Fisheries Investigations

TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 88 (January 6-13, 1966): The return of live yellowfin, skipjack, little tunny, and frigate mackerel to Kewalo Basin for density determinations was one of the main objectives of this cruise by the research vessel Charles H. Gilbert, operated by the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii. The area of operation was within 100 miles of Oahu and Kauai.

Other objectives of the cruise were to (1) collect and return live scombrids to behavior tank facilities; (2) collect yellowfin, skipjack, little tunny; and frigate mackerel for red muscle size determination; (3) collect and return live bait to behavior tank facilities; (4) collect lenses from the eyes of scombrids for amino acid assays.

Thermograph and barograph recordings were made continuously. A standard watch for fish, birds, and aquatic mammals was maintained. Trolling lines were out continuously between Kewalo Basin and each fishing station. The total trolling time was 36 hours. A total of 19 little tunny (Euthynnus affinis), 14 yellowfin (Thunnus albacares), and 2 wahoo (Acanthocybium solandri) were caught.

Note: See Commercial Fisheries Review, April 1966 p. 22.

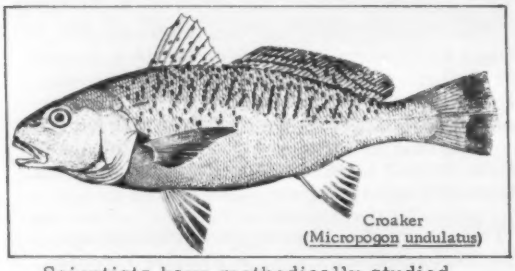
Chesapeake Bay

FRIGID WEATHER DESTROYS CROAKER CROP:

The possibility of a continued build-up of croaker populations in Chesapeake Bay experienced a serious setback during the extremely cold weather which clogged Virginia rivers with ice in late January and February 1966, according to the director of the Virginia Institute of Marine Science.

The head of the Institute's fish research reported that during a trawl cruise in search of young croakers in York River on February 11, no live fish were caught but many dead croakers were found in the river. During the December cruise young croakers were found in abundance, and had they survived, this year's crop, added to the production of two reasonably good seasons which occurred in 1963/64 and again in 1964/65, would have helped bring back this important commercial and sport fish.

A record catch of croakers occurred in 1945 when over 55 million pounds were landed in Virginia. Such an abundance of fish is as unlikely to occur in the near future as is the record low production of 1963 when only 122,400 pounds were landed. The rapid drop in catch immediately following 1945 led fishermen to request the Institute's scientists to study the habits of this fish and to determine the cause of decline.



Croaker
(Micropogon undulatus)

Scientists have methodically studied croakers, following their migrations into the Bay, checking the areas in which juveniles grow to "pinhead" size, and following their migration back to the ocean. Careful sampling of commercial catches has given considerable information about the age and size of fish being caught.

These studies indicate that fishing, either sport or commercial, was not the significant cause for the decreased production of croakers but that natural factors, chiefly weather conditions in the waters they inhabit, have controlled population levels.

During the 1957/58 winter, a former staff scientist reported that many young croakers appeared in the York and Pamunkey Rivers in late fall, but that when areas where they had been abundant were again sampled following a period of severely cold weather, the croakers had disappeared. He theorized that they were victims of cold weather.

"We tested this theory by subjecting young croakers to gradually lowering temperatures in the laboratory," the fish research head stated, "and young fish died at temperatures less severe than those they were subjected to in York River in early February 1966. Water temperatures recorded at the Institute's pier dropped as low as 29.5° F. and were below freezing for part of eight consecutive days. During winter 1966 surveys we collected dead croakers from the river, giving further support to the theory."

Some interesting facts gathered by scientists during the past ten years concerning the croaker population available to fishermen are: (1) croakers spawn in the Atlantic Ocean over the Continental Shelf from fall through early winter; (2) young croakers, sometimes no more than $\frac{1}{4}$-inch long, are transported by bottom currents from the ocean up to brackish water; (3) if young croakers are present in the brackish waters up the rivers and Bay during extended periods of extremely cold weather, large numbers will not survive the cold; (4) young croakers use protected estuarine waters as nursery areas the first summer of their lives and return to the ocean in early fall; they may return to Chesapeake Bay the following spring, at which time they are barely market or sport size; (5) very few fish over five years old occur in the commercial catch.

According to the Institute, the effects on croaker fishing from the severe winter weather of 1966 will not be apparent before 1967 when the number of small sport or market fish appearing in the catch will be reduced. Croaker fishing for the summer of 1966 is expected to be better than in the past two years unless there was also a winter mortality of one- and two-year old fish at sea. Those fish that do appear in the catch should be larger than those caught in the last two seasons. The stock of croakers will continue to be well below the past 25-year average.

Columbia River

SALMON HATCHERY EVALUATION PROJECT SHOWS PROMISING RESULTS:

"Operation Fin Clip," a joint study by Federal and state agencies to measure the contribution to sport and commercial fisheries of fall chinook salmon raised in Columbia River hatcheries, is showing "significant and encouraging results," Interior's Bureau of Commercial Fisheries reported March 18, 1966.

Artist's conception of a fall chinook salmon simulating the Pacific Coast from Alaska to California shows numbers of marked fish recovered by commercial and sport fishermen in "Operation Fin Clip." Largest number of marked fish (6,277) were taken the past three years in the Columbia River. Next biggest catch was recorded off British Columbia (3,260). Other recoveries were 77 off Alaska, 2,780 off Washington Coast, 703 off Oregon Coast, and 16 off California.

Preliminary analysis of data obtained thus far in the mammoth evaluation program indicates Columbia River hatchery fall chinook of the 1961 brood appearing in the fisheries in 1963, 1964, and 1965, have contributed about 2.6 million pounds of fish, valued at more than $1,500,000, to all fisheries.

The approximate cost of raising the fish in the hatcheries was about $350,000, giving a benefit-cost ratio of a little more than $3.50 to $1.

"Operation Fin Clip" has involved the marking of about 32 million young fish over a 4-year period. The Bureau, which provides financial aid for operation and maintenance of 21 state and Federal hatcheries on the Columbia River and its tributaries, launched the program in order to find out how much the hatcheries contribute to the total fish catch as a basis for determining whether to continue financing them.

"Operation Fin Clip" was inaugurated in 1962 with the marking of 1961 brood-year fish--that is, those fish hatched from adult salmon which had returned from the ocean to spawn in 1961. About 8 million fish, representing roughly 10 percent of each hatchery's production, were marked by excision of fins each year.

The first fish of the 1961 brood were recovered in 1963 as two-year-olds by sport fishermen at various points in the Pacific Ocean and in the Columbia River. Others were recovered by sport, commercial, and Indian fishermen in 1964 as three-year-olds and more in 1965 as four-year-olds. It is expected that recoveries of broods marked in 1963, 1964, and 1965 will continue into 1970.

Outside of the recoveries made in the Columbia River itself, the greatest number of marked fish were reported off British Columbia, indicating that Columbia River salmon contribute considerably to the fishery of Canada.

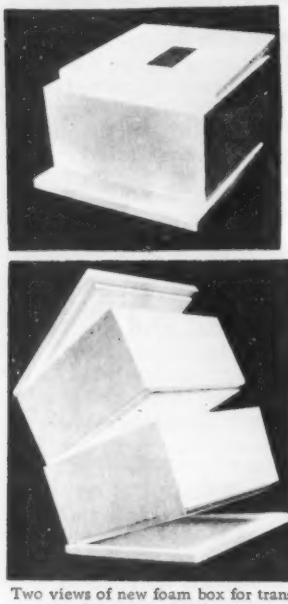
Containers

NEW FOAM BOX FOR TRANSPORTING LIVE TROPICAL FISH:

A modern high speed styrofoam molding plant now produces a newly designed patented styrofoam box for shipping live tropical fish. The plant is located at Palmetto, Florida.

The molding operation, situated on a fish farm, can produce about 2,500 boxes a day from the aluminum four-up mold. Both tops and bottoms of the box are molded four at a time. Special molding slugs are available so that the name of the shipper can be molded into the cover of the box to personalize the box with the name of the shipper.

The box, when used as a double pack, has a fitted cover which nests into the bottom of the box. Thus, when two boxes are shipped together, the bottom of the top box locks into the top of the bottom box, eliminating the need for the cover of the bottom box. The cover is, instead, placed on the bottom of the lower box, thus giving the fishes added protection at the bottom of the box, where they need it most. A rim around the bottom of the cover, plus the runners on the bottom of the box, creates a dead air space as well as lifting the fishes another inch from the floor. This has proven to be such protection that a double pack can be placed in a freezer and still hold the water temperature above 70° F. for almost 18 hours. The comparable "regular" box holds the temperature for only 5 hours. The price on the new patented box will be less than that of a regular box because of the savings in four-up molding. Standard boxes are made on one-up molds.



Two views of new foam box for transporting live tropical fish.

The firm is running the molding factory as a service to the tropical fish industry. It has not been created for profit, nor does it expect to prohibit other box manufacturers in Florida from making a similar box. Licensing arrangements are available to any manufacturer who cares to make a better box.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES OF FRESH AND FROZEN FISHERY PRODUCTS, JANUARY 1966:

The Armed Forces are a major buyer of fresh and frozen fishery products. Purchases of fresh and frozen fishery products for the Armed Forces in 1965 totaled about 28 million pounds with a value of about $19 million. This represents an important market for the U. S. fishing industry.

In January 1966 purchases of fresh and frozen fishery products for the Armed Forces were up 46.5 percent in quantity and 3.1 percent in value from the previous month. The increase was due mainly to larger purchases of scallops, flounder fillets, ocean perch fillets, and haddock fillets and portions.

Principal Fresh and Frozen Fishery Products Purchased by Defense Personnel Support Center, January 1966 with Comparisons

Product	January 1966 Quantity Pounds	January 1966 Avg. Cost Cents/Pound	January 1965 Quantity Pounds	January 1965 Avg. Cost Cents/Pound	Jan.-Dec. 1965 Quantity Pounds
Shrimp:					
raw headless	52,000	106	89,700	97	1,150,650
peeled and deveined	34,000	144	103,080	137	1,953,510
breaded	177,950	92	361,400	89	4,973,274
molded and breaded	7,000	88	76,100	64	707,160
Total shrimp	270,950	100	630,280	95	8,784,594
Scallops	252,750	83	165,400	83	1,933,674
Oysters:					
Eastern	49,056	122	39,476	107	744,621
Pacific	25,550	89	38,244	79	272,814
Total oysters	74,606	111	77,720	93	1,017,435
Fillets:					
Cod	21,000	44	31,900	34	504,690
Flounder	356,500	39	388,450	32	2,909,600
Ocean perch	404,000	36	369,290	33	3,619,060
Haddock	220,500	39	126,100	39	1,544,455
Haddock portions	237,250	52	208,500	50	1,855,834
Steaks:					
Halibut	89,600	60	103,900	48	1,373,760
Salmon	11,360	69	5,000	72	168,640
Swordfish	500	68	540	59	5,030

Note: Data shown do not represent total fishery purchases for the Armed Forces. Only the main items purchased are shown.

Compared with the same month in the previous year, purchases in January 1966 were down 6.2 percent in quantity and 13.7 percent in value. Average prices were generally higher in January 1966 as compared with the same month in 1965.

Fish Spotting

EXPERIMENTS USING BALLOONS FOR SPOTTING FISH CONTINUED:

A series of feasibility tests with balloons has been conducted over the past year by the Department of the Interior's Bureau of Commercial Fisheries Laboratory at La Jolla, Calif., in an effort to develop ship-based aerostats for use in fish spotting and in directing the setting of purse seines. The use of shore-based aircraft for these purposes, although greatly enhancing tuna production, is costly

and available at only a few of the fishing spots. The use of aircraft has been on the decline, partly due to the shifting of the fishery offshore.

Results of the Tuna Resources Laboratory's tests with a tethered hot-air balloon in 1965 indicated that the operation of such balloons is feasible from the deck of a fishing vessel. The model available for testing, however, had a spherical shape and therefore was vulnerable to high winds. Further tests were necessary with aerodynamically-shaped balloons.

A more recent test used a small (200 cubic feet) helium-filled balloon of aerodynamic shape (Vee-Line), which was towed behind a vessel. This balloon gave satisfactory results. The Vee-Line balloon was chosen for this test for reasons of economy. The fact that it was small and helium-filled did not detract from useful observations of its aerodynamic properties.

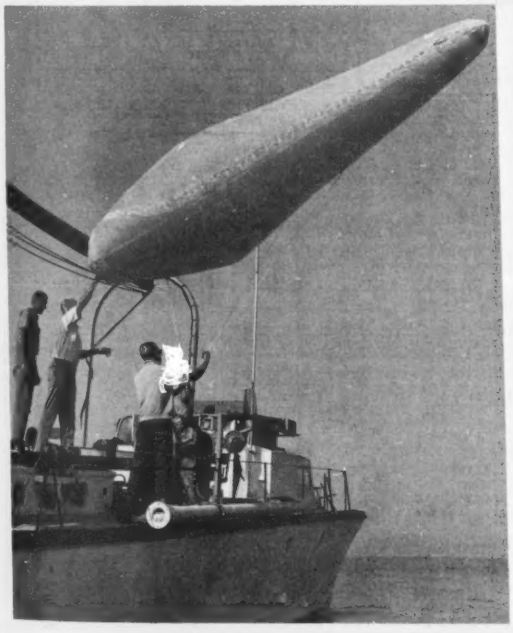


Fig. 1 - Launching Vee-Line balloon from Tuna Resources Laboratory research vessel.

During the latter tests, advantage was taken of the 8-pound payload potential of the Vee-Line balloon. Experiments conducted along with its flight observations showed that

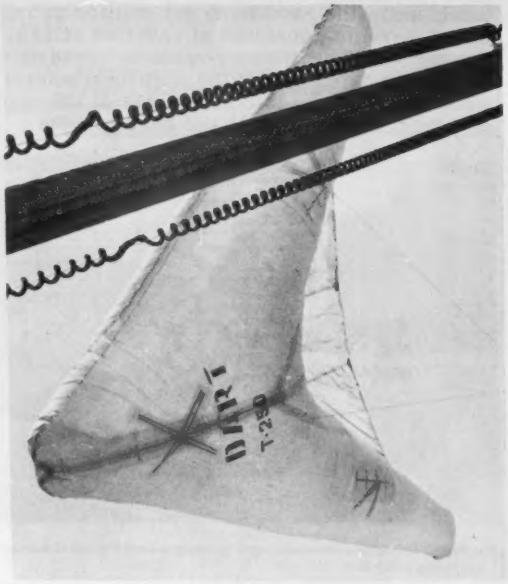


Fig. 2 - 200-cubic foot Vee-Line helium balloon riding above vessel.

small balloons of this type may also be useful in marine research by carrying aloft small instrument packages, such as the radio-controlled camera successfully used in one experiment, or sensor strings for oceanographic measurements, eliminating the "investigator effect" caused by the proximity to a vessel or other floating platforms. Further work, using a balloon, is contemplated following acquistion of a 400 cubic foot Vee-Line balloon.

Note: See Commercial Fisheries Review, May 1965 p. 18.

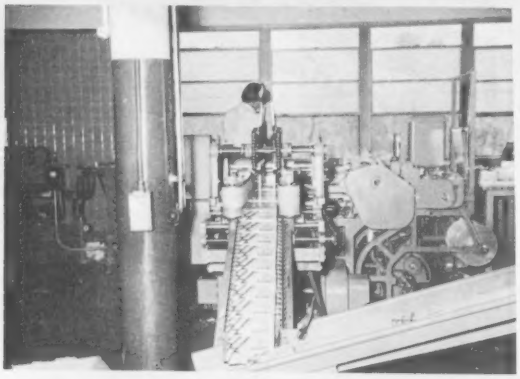
Fish Sticks and Portions

U. S. PRODUCTION, 1965:

United States production of fish sticks and portions during 1965 amounted to 221.7 million pounds valued at $91.4 million--a gain of 23.3 percent in quantity and 37.3 percent in value as compared with 1964. Fish sticks totaled 82.3 million pounds in 1965--8.7 million pounds or 11.8 percent higher than 1964, and fish portions amounted to 139.4 million pounds--up 33.1 million pounds or 31.2 percent.

Cooked fish sticks (77.2 million pounds) made up 93.9 percent of the 1965 fish stick

total, while the remaining 5.1 million pounds or 6.1 percent consisted of raw fish sticks. A total of 139.4 million pounds of breaded fish portions (of which 105.5 million pounds were raw) and 2.6 million pounds of unbreaded portions were processed during 1965.



Packaged fish-stick consumer-size packages coming off the overwrapping machine.

Table 1 - U. S. Production of Fish Sticks by Months and Type, 1965 1/

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)		
January	6,524	278	6,802
February	6,259	261	6,520
March	7,557	513	8,070
April	6,045	367	6,412
May	5,027	443	5,470
June	6,510	303	6,813
July	4,911	431	5,342
August	6,203	401	6,604
September	6,903	535	7,438
October	7,364	483	7,847
November	7,085	525	7,610
December	6,843	511	7,354
Total quantity: 1965 1/	77,231	5,051	82,282
1964	67,810	5,764	73,574
	($1,000)		
Total value: 1965 1/	33,698	2,003	35,701

1/Preliminary.

Table 2 - U.S. Production of Fish Sticks by Months, 1961-65

Month	1/1965	2/1964	1963	1962	1961
	(1,000 Lbs.)				
January	6,802	7,226	7,554	6,082	6,091
February	6,520	7,062	8,241	6,886	7,097
March	8,070	6,965	8,053	7,658	7,233
April	6,412	5,871	6,546	5,719	5,599
May	5,470	5,661	5,750	5,643	5,129
June	6,813	4,221	6,125	5,117	4,928
July	5,342	3,815	4,870	3,740	3,575
August	6,604	6,310	5,696	5,760	6,927
September	7,438	6,482	5,865	6,582	5,206
October	7,847	7,029	8,128	6,698	6,133
November	7,610	6,153	6,471	6,305	6,288
December	7,354	6,779	6,003	6,027	5,618
Total	82,282	73,574	79,302	72,217	69,824

1/Preliminary.
2/Revised.

Table 3 - U.S. Production of Fish Sticks by Areas, 1965 and 1964

Area	1/1965		1964	
	Firms	Quantity	Firms	Quantity
	No.	1,000 Lbs.	No.	1,000 Lbs.
Atlantic Coast States	25	64,866	23	57,375
Inland & Gulf States	7	8,639	8	8,276
Pacific Coast States	10	8,777	14	7,923
Total	42	82,282	45	73,574

1/Preliminary

Table 4 - U.S. Production of Fish Portions by Months, 1965 1/

Month	Cooked	Breaded Uncooked	Total	Unbreaded	Total
		(1,000 Lbs.)			
January	2,434	6,876	9,310	197	9,507
February	1,909	6,479	8,388	180	8,568
March	2,950	9,414	12,364	349	12,713
April	2,260	8,208	10,468	196	10,664
May	1,725	8,626	10,351	233	10,584
June	1,648	9,516	11,164	179	11,343
July	2,010	7,952	9,962	105	10,067
August	3,311	10,693	14,004	139	14,143
September	3,201	9,398	12,599	235	12,834
October	3,794	9,925	13,719	343	14,062
November	2,921	9,547	12,468	151	12,619
December	3,194	8,849	12,043	291	12,334
Total qty. 1965 1/	31,357	105,483	136,840	2,598	139,438
Total qty. 1964	20,956	82,816	103,772	2,541	106,313
		($1,000)			
Total val. 1965 1/	13,154	41,521	54,675	982	55,657
Total value 1964	8,667	26,955	35,622	910	36,532

1/Preliminary.

Table 5 - U.S. Production of Fish Portions by Areas, 1965 and 1964

Area	1/1965		1964	
	Firms	Quantity	Firms	Quantity
	No.	1,000 Lbs.	No.	1,000 Lbs.
Atlantic Coast States	26	87,443	26	63,955
Inland & Gulf States	10	48,992	13	39,662
Pacific Coast States	9	3,003	11	2,696
Total	45	139,438	50	106,313

1/Preliminary.

Table 6 - U.S. Production of Fish Portions by Months, 1961-65

Month	1/1965	2/1964	1963	1962	1961
	(1,000 Lbs.)				
January	9,507	8,877	8,173	5,077	4,303
February	8,568	8,497	7,361	6,360	4,902
March	12,713	8,761	8,835	7,036	5,831
April	10,664	8,016	7,919	6,408	4,484
May	10,584	7,621	7,293	5,818	3,879
June	11,343	7,672	8,774	6,137	4,039
July	10,067	6,599	4,524	4,679	3,962
August	14,143	9,398	6,684	6,687	4,963
September	12,834	9,830	9,621	7,180	5,745
October	14,062	11,123	9,877	9,871	6,759
November	12,619	10,922	8,136	7,406	5,789
December	12,334	8,997	7,447	6,019	5,191
Total	139,438	106,313	94,644	78,678	59,847

1/Preliminary.
2/Revised.

The Atlantic Coast was the principal area in the production of both fish sticks and fish portions with 64.9 and 87.4 million pounds, respectively. The Pacific Coast States were next with 8.8 million pounds of fish sticks but

the inland and Gulf States were second with 49.0 million pounds of fish portions.

Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January 1966: Based on domestic production and imports, the United States available supply of fish meal for January 1966 amounted to 18,147 short tons--656 tons (or 3.5 percent) less than during the same month in 1965. Domestic production was 49 tons (or 1.8 percent) higher, but imports were 705 tons (or 4.4 percent) lower than in January 1965. Peru continued to lead other countries with shipments of 8,253 tons.

U. S. Supply of Fish Meal and Solubles, January 1966

Item	January 1966	January 1965	Total 1965
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	1/	1/	172,158
Tuna and mackerel	1,598	1,914	26,423
Herring	1/	244	12,050
Other	1,221	612	29,849
Total production	2,819	2,770	240,480
Imports:			
Canada	2,998	2,408	43,830
Peru	8,253	11,933	209,801
Chile	-	1,102	5,651
Norway	22	-	78
So. Africa Rep.	-	-	5,100
Other countries	4,055	590	6,206
Total imports	15,328	16,033	270,666
Available fish meal supply	18,147	18,803	511,146
Fish Solubles:			
Domestic production	1,169	907	93,853
Imports:			
Canada	129	100	1,488
Iceland	33	-	-
Other countries	-	550	3,650
Total imports	162	650	5,138
Available fish solubles supply	1,331	1,557	98,991

1/Included with "other."

The United States supply of fish solubles during January 1966 amounted to 1,331 tons--a decrease of 14.5 percent as compared with the same month in 1965. Domestic production rose 28.9 percent and imports of fish solubles decreased 75.1 percent.

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, February 1966: Preliminary data as collected by the Department of the Interior's Bureau of Commercial Fisheries:

U. S. Production 1/ of Fish Meal, Oil, and Solubles, February 1966 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles
	Short Tons	1,000 Lbs.	Short Tons
February 1966:			
East & Gulf Coasts	623	72	806
West Coast 2/	1,747	258	724
Total	2,370	330	1,530
Jan.-Feb. 1966 Total	5,189	709	2,699
Jan.-Feb. 1965 Total	5,027	1,051	1,710

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.

* * * * *

Production, January 1966: During January 1966, a total of 2,819 tons of fish meal and 379,000 pounds of marine-animal oil was produced in the United States. Compared with January 1965 this was an increase of 49 tons of fish meal but a decrease of about 194,000 pounds of marine-animal oil. Fish solubles production amounted to 1,169 tons--an increase of 262 tons as compared with January 1965.

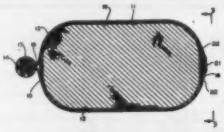
U. S. Production of Fish Meal, Oil, and Solubles, January 1966 1/ with Comparisons

Product	January 1/1966	January 1965	Total 1965
	(Short Tons)		
Fish Meal and Scrap:			
Herring	2/	244	12,050
Menhaden 3/	2/	2/	172,158
Tuna and mackerel	1,598	1,914	26,423
Unclassified	1,221	612	19,349
Total 4/	2,819	2,770	229,980
Fish solubles:			
Menhaden	2/	-	72,948
Other	1,169	907	20,905
Total	1,169	907	93,853
	(1,000 Pounds)		
Oil, body:			
Herring	2/	163	7,767
Menhaden 3/	2/	2/	172,037
Tuna and mackerel	185	236	5,458
Other (incl. whale)	194	174	5,402
Total oil	379	573	190,664

1/Preliminary data.
2/Included in "unclassified" or "other."
3/Includes a small quantity of thread herring.
4/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

Inventions

RING BUOY LIFE PRESERVER PATENTED:
A patent was recently granted on a plastic life preserver with foamed plastic cord covered with fiberglass or plastic material permanently colored international orange. (Meets U. S. Coast Guard and military requirements.) The inventor claims that it equals or exceeds the buoyancy of a cork buoy with only one-half the weight, and it will not rot or mildew. Patterns for four sizes are available. (U. S. Patent No. 3,095,586 issued Ludwig S. Baier, P. O. Box 158, Tolovana Park, Oreg. 97145.)



Marketing

EDIBLE FISHERY PRODUCTS, 1965 AND OUTLOOK FOR 1966:
No appreciable changes are foreseen in the supplies of edible fishery products for 1966. Total domestic landings probably will vary little from 1965 but imports likely will continue to rise. Import increases are expected for such major items as frozen shrimp, spiny lobster tails, ocean perch fillets, and the blocks and slabs of fillets from which sticks and portions are manufactured.

lets and steaks of flounder, haddock, and ocean perch, and less raw-headless shrimp in cold storage. Canned pink and chum salmon stocks were relatively low near the end of 1965 but stocks of canned red salmon were up substantially from a year ago.

Fig. 2 - Fishing trawlers tied up at Boston Fish Pier for unloading. At right in foreground is the New England Fish Exchange building.

Retail prices for fishery products averaged higher in the first quarter of 1966 than a year earlier, reflecting generally stronger demand conditions for meat and fish. Price increases were expected in both the fresh and frozen, and canned fish categories.

The quantity of edible fish available in 1965 set a record high of slightly over 5 billion pounds, up about 3 percent from 1964. On a

Fig. 1 - Attractive fresh fish display.

During the first quarter of 1966, supplies of a few popular frozen products were expected to be more plentiful than a year earlier. Cold-storage holdings of crabs, spiny lobster tails, breaded shrimp, and scallops were up as the year began, along with fish sticks and portions. There were fewer fil-

round weight basis (as caught), imports contributed a record high 51 percent of the total. Substantially larger quantities of blocks of fish fillets and albacore tuna were imported in 1965 than a year earlier. In-shipments of both headless and peeled shrimp were up as were ocean perch fillets, flounder fillets, and sardines canned in oil.

Per capita consumption of fishery products during 1965 increased to 11.0 pounds (edible weight) from 10.5 pounds in 1964. Consumption of fresh and frozen fishery products in 1965 increased to 6.0 pounds per person and for canned fish to 4.5 pounds.

Note: This analysis was prepared by the U. S. Department of the Interior's Bureau of Commercial Fisheries, and published in the U. S. Department of Agriculture's February 1966 issue of the National Food Situation (NFS-115).

Michigan

CHANGES IN COMMERCIAL FISHING REGULATIONS:

Starting June 1, 1966, commercial perch fishing will be liberalized in Michigan waters of the Great Lakes under a new plan to promote better growth rates among those fish and to speed the turnover in their populations.

The relaxed regulations, aimed at improving perch fishing for sportsmen as well as commercial operators, was given final approval by the Michigan Conservation Commission.

Under changes adopted, size and weight limits will be removed for processed and "in the round" perch. Also, closed commercial seasons on those fish will be dropped except in a 50-mile stretch of Saginaw Bay and Lake Huron waters.

Commercial perch fishing will be off limits from June 10 through Sept. 10 in waters less than 18 feet deep between Point Au Gres and Harrisville. Purpose of the three-month closing is to curb conflicts between commercial and sport fishermen during the peak of the tourist season.

In other action taken, the Commission tentatively approved a ban on commercial fishing for northern pike in the Great Lakes.

The measure, which must be aired at public hearings before coming back to the Commission for final action, is in keeping with the Conservation Department's program to spur sport fishing in the big waters.

It is not expected to produce a spectacular increase in pike populations because there is no indication that commercial fishing has overexploited those fish.

While taking into account that pike are of only incidental importance to commercial operators, the proposed ban reflects the fact that anglers have a major interest in those trophy fish. (Michigan Department of Conservation, February 17, 1966.)

* * * * *

LAWMAKERS SEEK FUNDS UNDER ANADROMOUS FISH ACT OF 1965:

A joint legislative resolution of the Michigan legislative body, urging that Michigan receive maximum allotments under the new Federal fish program, was submitted in early March 1966 to a Congressional appropriations subcommittee.

The request is keyed to Government plans, authorized under an act of 1965, which call for allocating $25 million in federal funds through mid-1970 to promote anadromous fisheries in the nation, Public Law 89-304.

A new project is under way by the Michigan Department of Conservation to introduce another anadromous fish--the coho salmon--in the Great Lakes.

The joint resolution presented to the Congressional subcommittee is focused on the coho project and the Michigan Department's plans to boost populations of steelheads and other anadromous fish in the Great Lakes. (Michigan Department of Conservation, March 10, 1966.)

North Atlantic Fisheries Explorations and Gear Development

TRAWL GEAR EVALUATIONS AND HADDOCK SURVEY:

M/V "Delaware" Cruise 66-1 (February 7-17, 1966): Comparative tows between the Department of the Interior's Bureau of Commercial Fisheries exploratory fishing vessel Delaware and similar class vessels using the standard No. 41 otter trawl, and terminal trials with the Atlantic Western Trawl, Model III, were the primary objectives during this cruise. Additional objectives achieved coincidently with the gear trials were (1) the procurement and storing of live fish, frozen fish, and iced fish, and (2) the reporting (to U. S.

fishing vessels) by radiotelephone of commercial quantities of haddock found in areas north of Georges Bank.

Catch of 4,000 to 5,000 pounds of mixed groundfish, primarily haddock, taken with the Atlantic Western Trawl, Model III, during Delaware Cruise 66-1.

The No. 41 trawl used aboard the Delaware during this cruise was made up of the following materials and rigging:

Section	Material	Mesh Size
Top wing	Polyethylene	5"
Bottom wing	Manila	5"
Square	Polypropylene	5"
Lower belly	Manila	4½"
Top belly	Polyethylene	4½"
Extension	Polypropylene	4½"
Cod end	Nylon	4½"
Chafing gear	Cowhide	

The roller gear consisted of 20-inch diameter rubber rollers in the bosom, 18-inch diameter rubber rollers along 15 feet of wings from the quarter and 27 feet of rounded (rope wrapped) wire along the remainder of the wings. Fifty floats were secured to the headrope: 20 were along the bosom and 15 were on each wing. Standard 10.5-foot doors weighing 1,250 pounds were used with 5-fathom legs and 10-fathom ground cables.

Six tows were made with the No. 41 net on Georges Bank in areas southeast of the "Leg" (in the "Winter Fishing Ground") and on the "Northern Edge." All tows were made in company with various Boston otter trawlers and Canadian vessels. Towing results were similar in yield to those vessels in the vicinity; time adjustments were applied when commercial vessels made longer tows. After satisfactory comparative towing information was compiled with the No. 41 trawl, the net was removed and the Atlantic Western Trawl, Model III, was substituted.

The rigging data on the Atlantic Western Trawl, Model III, are:

Section	Material	Mesh Size
Wings	Polyethylene	5"
Square	Polypropylene	4½"
Bellies	Polypropylene	4½"
Extension	Polypropylene	4½"
Cod end	Nylon	4½" (double)
Chafing gear	Polypropylene strands (Hula Skirt)	

The roller gear consisted of 20-inch diameter rubber rollers in the bosom and 18-inch diameter rubber rollers along 15 feet of wings from the quarters. The remainder of the wing footrope was fitted with rubber discs. Thirty-six floats were secured to the headrope: 20 along the bosom and 8 on each wing. Standard 10.5-foot doors weighing 1,250 pounds were used with 15-fathom legs.

The Atlantic Western Trawl was set 17 times in various areas off George Bank. The best concentrations of haddock encountered during this cruise were found when the Delaware was fishing alone northeast of Brown's Bank in 70 to 85 fathoms of water. Reports of these tows were broadcast by radio to two Boston-based vessels fishing on the southwest part of Brown's and the northwest edge of Brown's. These vessels were the only known U. S. vessels within immediate steaming distance of the Delaware.

The remaining areas in which the Atlantic Western Trawl was fished were northwest and west of Georges Bank. With the exception of one tow when 4,000 pounds of ocean perch were caught, the prevalent species encountered were haddock. The range in the yields during the remainder of tows with the Atlantic Western Trawl was consistent with commercial results at that time; the Delaware experienced spotty fishing which was in agreement with results of the fleet. The few times this net was fished within sight of other vessels its yields, based on radio reports, compared favorably with those of the other vessels.

The primary objectives of this cruise were realized both with the No. 41 trawl and the Atlantic Western Trawl. The Delaware was able to produce on a par with other vessels

using similar gear. Fishing trials indicated that replacement of the rounded wire sweep with rubber disc-covered wire and modification of the net by hanging the wing ends to the sweep and shortening the ground cables, when fishing the rougher bottoms, would reduce wing damage to some extent yet maintain good fishing characteristics with the No. 41 trawl.

The trials with the Atlantic Western Trawl indicated that this net has good fish catching qualities on fish both at or near the bottom. Minor difficulty in setting the net, due to its long sweep and the unfamiliarity of the crew with the net's construction details, were the most notable disadvantages experienced during this cruise. Evaluation of the trawl beyond this stage, as a commercial fishing unit, will require fishing trials aboard industry vessels in production operations. Two Atlantic Western Trawls, Model III and Model IV, of proper size for vessels of 700 hp. or greater and for 150 to 300 hp. are available for further cooperative evaluation projects.

Note: See Commercial Fisheries Review, November 1965 p. 30.

Oceanography

2ND ANNUAL OCEANOGRAPHIC AND MARINE SCIENCES MEETING:

The Marine Technology Society (MTS) will hold its 2nd Annual Conference & Exhibit in Washington, D. C., June 27-29, 1966.

Announcement of plans for the "1966 MTS Show" follows the successful symposium conducted by the Marine Technology Society and other technical societies in Washington in January 1966. Titled, "Man's Extension into the Sea," this two-day symposium drew more than 1,600 scientific and engineering people from across the country--double the original estimated attendance.

The theme of the June Conference & Exhibit is "Exploiting the Oceans." The three-day technical program will include more than 70 presentations by recognized authorities with emphasis on both opportunities and problems as industry and government expand and build to explore and use the vast resources of the world oceans. The four major subject areas are: (1) ocean floor minerals and chemical extracting, (2) fisheries and food from the sea, (3) legal aspects of exploration and exploitation, and (4) new techniques and hardware for ocean research, survey, and underwater operations.

* * * * *

BUREAU'S RESEARCH VESSEL LAUNCHED:

The newest and largest vessel in the Bureau of Commercial Fisheries' growing research fleet, the Miller Freeman, was scheduled to be launched April 2, 1966, at the Lorain, Ohio, shipyards of the American Ship Building Company, according to Secretary of the Interior Stewart L. Udall.

The new vessel was assigned to the Bureau's Biological Laboratory in Seattle, Wash. The shakedown cruise planned to take it to Seattle via the St. Lawrence Seaway to the Atlantic Ocean, then through the Panama Canal to the Pacific.

The Miller Freeman will be used for high-seas oceanography and fishery research in the North Pacific and Bering Sea. Its size will permit extended cruises to the West Pacific. The vessel will also assist in carrying out provisions of the 1953 International North Pacific Fisheries Convention signed by the United States, Canada, and Japan. The Convention concerns both the catch and the conservation of halibut and salmon--and the research necessary to meet international agreements.

The $3 million vessel is designed to carry a crew of 27, with additional quarters and facilities for 9 scientists. It is a 216-ft. stern ramp vessel, with a 42-ft. beam, powered by a 2,150-hp. diesel engine.

The vessel is named for Miller Freeman, Seattle conservationist and publisher, who died in 1955. He founded the publication Pacific Fisherman in 1903, which he dedicated to fishermen of the Pacific Coast. He devoted much of his energy to advancing international conservation of fishery resources.

Oregon

COHO SALMON TRANSPLANTS:

Some 30,900 adult coho (silver) salmon have been hauled from their home waters to new streams this season in an effort to make best

use of the spawn-ready fish, which are surplus to the needs of Oregon Fish Commission hatcheries. The big venture, in its second year of operation, is a joint effort of the Oregon Game Commission and the Fish Commission and marks the first mass use of this technique to expand the production of coho salmon. According to the Fish Commission hatchery chief, it has been found that coho salmon will spawn naturally in other than their natal streams if transplanted just prior to spawning time. The transplant of adult fish is started only after the egg requirements of hatcheries are assured and enough fish have been placed above racks on hatchery streams to take full advantage of whatever spawning grounds are available.

With the advent of increasing hatchery surpluses of coho salmon in recent years, other means had to be found to deal with the fish that would otherwise be wasted. The fish lift was conceived as the most immediate solution. One of the limiting factors in this program has been the shortage of suitably equipped trucks with which to haul adult salmon during the normal October through December migration period.

Even though planning started early for the massive transplant this past season, a frustrating delay in the arrival of fall rains held back the runs of migrating coho salmon. In early November when the rains finally did arrive, they triggered an explosion of coho that virtually swamped hatchery-holding facilities and exceeded the ability of the fish taxis to haul them out. This factor was mainly responsible for the reduction in fish hauled this year over last year when 38,000 cohos made the trips. Unfortunately the Christmas 1964 floods caused an inestimable amount of damage to the spawn deposited in the gravel of the transplant streams a year ago. If nature cooperates this season more production can be expected from the efforts. (Oregon Fish Commission, Feb. 21, 1966.)

Oysters

ARTIFICIAL PROPAGATION DISCUSSED AT OLYMPIA MEETING:

Oyster larvae can now be artificially grown the year round by comparatively simple methods, according to reports from a meeting of oyster growers and marine biologists held in Olympia, Wash., by the Washington Department of Fisheries, March 8, 1966. However, stages from the spat, or young oyster, to an oyster of a size that can be put out on beds still present difficulties. There are indications that these difficulties may soon be solved, and it could be possible to produce commercial quantities of oyster and clam seed the year round to supply growers.

Featured speakers at the meeting included the former director of the Milford, Conn., shellfish laboratory of the U. S. Fish and Wildlife Service, a leader and innovator in the artificial propagation of bivalve seed. He spoke on the history of the artificial propagation of bivalve molluscs and told of the advances made in the past few years. He said that the new laboratory at Milford will include a school where oyster growers may study and participate in the work to become familiar with artificial propagation procedures.

A State of Washington fisheries biologist told of the experiments conducted in 1964 and 1965 at the Hoodsport salmon hatchery in modified salmon rearing ponds on the artificial propagation of European oyster seed. He also told of the operation of a pilot plant for the production of oyster and clam seed that has been in use at the Pt. Whitney shellfish laboratory since 1958.

The Director of the Bureau of Commercial Fisheries shellfish laboratory at Oxford, Md., told of seed production procedures used at that laboratory. The Deputy Regional Director of the Bureau's Region I, gave his views of the future possibilities of the sale of Pacific Northwest oysters throughout the United States and world-wide. He said the recent decrease in air freight rates made it possible to ship fresh salmon to Paris and other European cities as a luxury item and that in the near future, there will be a market for American oysters in a prosperous Europe.

A question and answer period followed the reports, with the experts fielding questions from oyster growers, who seemed interested in the training that will be possible at the Milford laboratory. (Washington State Department of Fisheries, March 9, 1966.)

Salmon

U. S. PACIFIC COAST CANNED STOCKS, FEBRUARY 1, 1966:

On February 1, 1966, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 1,913,780 standard cases (48 1-lb. cans)--564,181 cases less than on February 1, 1965, when stocks totaled 2,477,961 standard cases.

Table 1 - Total Canner's Stocks of Pacific Canned Salmon, February 1, 1966

Species	Feb. 1, 1966	Jan. 1, 1966	Dec. 1, 1965
	(No. of Actual Cases)		
King	87,321	109,284	123,126
Red	1,553,294	1,801,354	1,902,932
Coho	155,072	173,560	193,729
Pink	520,292	651,279	767,120
Chum	201,711	263,268	305,471
Total	2,517,690	2,998,745	3,292,378

On the basis of total stocks of 2,517,690 actual cases (consisting of cans of $\frac{1}{4}$-lb., $\frac{1}{2}$-lb., 1-lb., etc.), red salmon accounted for 1,553,294 cases (mostly 1-lb. and $\frac{1}{2}$-lb. cans) or 61.7 percent of the total canners' stocks on February 1, 1966; pink salmon accounted for 520,292 cases or only 20.7 percent (336,663 cases were 1-lb. talls). Next came chum (201,711 cases, mostly 1-lb. talls), followed by coho or silver (155,072 cases), and king salmon (87,321 cases).

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965, the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Shipments at the canners' level of all salmon species from July 1, 1965, to February 1, 1966, totaled 2,360,982 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses); king, 95,503 standard cases (78,155); red, 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 96 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Canners Association, February 25, 1966.)

Note: See Commercial Fisheries Review, April 1966 p. 36.

Table 2 - Total Canners' Stocks on Hand February 1, 1966 (Sold and Unsold), by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 $\frac{1}{4}$-lb.	4,710	152,181	60,044	2,708	66	219,709
48 $\frac{1}{2}$-lb.	75,554	532,232	60,557	168,650	41,264	878,257
48 1-lb.	6,760	865,160	27,751	336,663	154,747	1,391,081
12 4-lb.	297	3,721	6,720	12,271	5,634	28,643
Total	87,321	1,553,294	155,072	520,292	201,711	2,517,690

Table 3 - Canners' Shipments from July 1, 1965 to February 1, 1966, by Species and Can Size

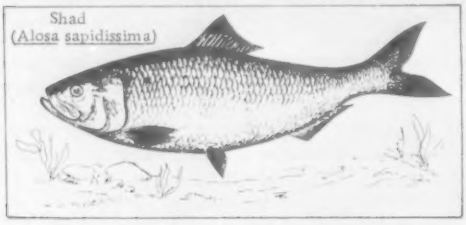
Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 $\frac{1}{4}$-lb.	9,490	272,867	64,794	5,785	1	352,937
48 $\frac{1}{2}$-lb.	93,298	450,783	71,991	243,690	52,828	912,590
48 1-lb.	13,971	595,463	80,349	712,974	343,796	1,746,553
12 4-lb.	42	5,738	7,549	45,668	10,987	69,900
Total	116,717	1,324,851	224,683	1,008,117	407,612	3,081,980

Shad

SUSQUEHANNA STUDY PROGRAM EXTENDED THROUGH JUNE 1966:

An intensive research project to determine if American shad can be re-established in the Susquehanna River system is being extended for an additional six months, the Department of the Interior announced.

The project, begun in the spring of 1963, was scheduled to terminate in December 1965. A recent meeting of representatives from power companies maintaining dams on the river, State conservation departments of Maryland, New York, and Pennsylvania, and Interior's Bureau of Sport Fisheries and Wildlife and Bureau of Commercial Fisheries, determined that the study phase concerning adult shad should continue through one more spawning season. Studies would be continued to obtain additional information on the behavior of adult shad.


Shad
(Alosa sapidissima)

Several adult shad carrying sonic devices that transmit signals to shore receivers, and shad wearing the standard visual tags, have been transplanted in the Susquehanna above the dams. Some signals were picked up both above and below the point of release by the receiving equipment, but many of the sonic-tagged fish were never "heard from" again.

The Susquehanna shad research project has two phases. The first determined that shad eggs would hatch in the river and that young shad from these eggs could move downstream through sections of the river polluted by mine acid drainage, and through the dams.

The second phase is to determine whether adult shad will migrate upstream through the impoundments if they are provided a means of bypassing the dams.

The Conowingo Dam fish trap in Maryland, which was constructed for the study, is being modified, and a much larger number of tagged fish will be transplanted this spring to get a definite answer to this second question.

The research project has been a cooperative one, with State and Federal agencies providing biologists and equipment. The power companies--Philadelphia Electric Company, Pennsylvania Power and Light Company, Metropolitan Edison Company, and the Safe Harbor Water Power Corporation--volunteered to finance the study which could lead to a Federal Power Commission ruling that fishways be constructed around the four dams involved. The companies have provided nearly $200,000 for the study.

Note: See Commercial Fisheries Review, May 1965 p. 34.

Shrimp

BREADED PRODUCTION, 1965:

United States production of breaded shrimp during 1965 amounted to about 97.2 million pounds--an increase of 6.4 percent as compared with 1964.

The Gulf States ranked first in the production of breaded shrimp in 1965 with 60.9 mil-

Table 1 - U.S. Production of Breaded Shrimp by Months, 1964-65

Month	1/1965	2/1964
	(1,000 Lbs.)	
January	7,442	7,401
February	7,117	8,100
March	8,348	7,303
April	7,366	7,081
May	7,304	6,224
June	7,371	6,641
July	7,401	8,697
August	9,040	7,354
September	9,315	7,885
October	9,475	9,225
November	8,957	7,907
December	8,050	7,515
Total	97,186	91,333

1/Preliminary.
2/Revised.

Table 2 - U. S. Production of Breaded Shrimp by Areas, 1964-65

Area	1/1965			2/1964		
	Plants No.	Quantity 1,000 Lbs.	Value $1,000	Plants No.	Quantity 1,000 Lbs.	Value $1,000
Atlantic	19	29,149	21,588	25	28,937	19,822
Gulf	24	60,922	48,736	28	55,038	38,384
Pacific	7	7,115	5,885	9	7,358	5,182
Total	50	97,186	76,209	62	91,333	63,388

1/Preliminary.
2/Revised.

Table 3 - U. S. Production of Breaded Shrimp, 1955-65

Year	Quantity	Value
	1,000 Lbs.	$1,000
1/1965	97,186	76,209
2/1964	91,333	63,388
1963	76,216	53,527
1962	76,803	62,230
1961	73,795	55,089
1960	70,348	47,015
1959	69,764	45,314
1958	60,865	43,622
1957	51,085	37,764
1956	50,888	37,301
1955	38,991	26,907

1/Preliminary.
2/Revised.

lion pounds, followed by the Atlantic States with 29.1 million pounds, and the Pacific States with 7.1 million pounds.

* * * * *

UNITED STATES SUPPLY AND DISPOSITION, 1963-65:

The available United States shrimp supply in 1965 was 10.0 percent higher than in 1964 and 4.7 percent higher than in 1963. United States shrimp imports again were at a record high in 1965, having increased 5.6 percent from the previous year and 6.9 percent from the 1963 imports.

U. S. Supply and Disposition of Shrimp, 1963-1965

Item	1/1965	2/1964	1963
	. . . (1,000 Lbs., Shell-on). . .		
Supply--Heads-on weight:			
Domestic landings	245,400	211,821	240,478
Foreign product of U.S. fisheries 3/	640	1,040	253
Imports 4/	284,617	269,651	266,205
Total supply (heads-on)	530,657	482,512	506,936
Disposition--Heads-on weight (approximate):			
Frozen:			
Headless	6/	289,593	283,271
Meat, raw (includes some cooked) 5/	6/	105,506	109,703
Meat, cooked 5/	6/	21,611	15,232
Breaded	98,000	91,841	76,700
Specialties 5/	6/	1,552	1,020
Total frozen 7/	425,410	405,182	398,978
Canned	68,780	43,058	68,272
Sun-dried	6,975	4,845	5,640
Fresh	26,000	25,000	27,000
Unclassified	3,492	4,427	7,046

1/Preliminary.
2/Revised.
3/Caught by domestic craft, principally in waters off Central America, and shipped to the United States. Reported by the U. S. Bureau of the Census as "Products of the American Fisheries."
4/The composition of imported shrimp includes estimates for 1963. Imports by commodities listed below were converted to heads-on weight by multiplying the quantity of headless shrimp by 1.59, raw meat by 2.04, cooked meat by 3.13, breaded by 1.00, canned by 3.21, dried by 7.69, and unclassified by 1.59.

Item	1965	1964	1963
	. . . . . (1,000 Lbs.)		
Shrimp:			
Headless	114,324	112,149	111,717
Meat, raw	31,961	27,385	29,460
Meat, cooked	2,883	2,585	2,547
Breaded	778	508	484
Canned	2,248	3,004	4,120
Cured	407	404	279
Unclassified	(a)10,487	(b)8,541	2,923
Total	163,058	154,576	151,530

(a) Estimated to include headless 6,700,000 pounds and raw meat 1,800,000 pounds.
(b) Estimated to include headless 4,800,000 pounds and raw meat 1,200,000 pounds.

5/May include some fresh products.
6/Not available.
7/The totals do not add and are less than actual totals because products frozen more than once were eliminated.
Note: To convert the weight of heads-on shrimp to heads-off, divide by 1.59 which will give approximate weight of heads-off shrimp.

Tuna

ATTRACTANT STUDY:

The effectiveness of various types of floating objects in attracting tuna is being tested in the Pacific Ocean off Central America. The Department of the Interior's Bureau of Commercial Fisheries Tuna Resources Laboratory, La Jolla, Calif., has chartered for 60 days the San Diego sportfishing boat HM-85, which left San Diego on March 5, 1966.

Scientist observes fishes associating with a floating tree in the open sea off Costa Rica.

Bureau scientists who boarded the boat when it arrived in Puntarenas, Costa Rica, hope to learn why fish are attracted to drifting materials at sea and to develop an object which will be efficient in attracting tuna and skipjack. The results of the studies could lead to the use of attractors by American tuna fishermen to concentrate tuna schools.

It is well known to tuna fishermen that yellowfin tuna, skipjack, and many other fish col-

lect near and beneath drifting logs, branches, seaweed, and other materials at sea. Fishermen usually inspect drifting material to look for schools of tuna, and set their nets around such objects when commercial quantities of fish are present. In one year, a total of 1,500 tons of yellowfin and skipjack tuna was caught by California fishermen in that manner. As many as 200 tons of tuna were captured from a single drifting log.

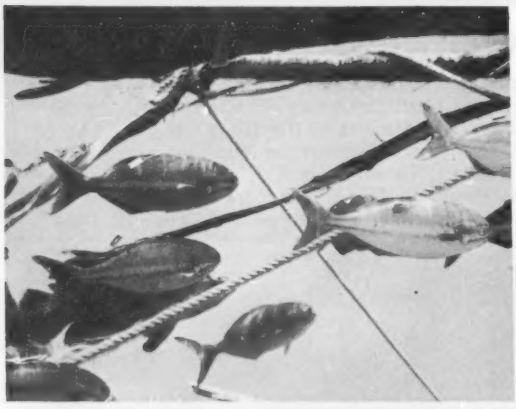


Fig. 2 - Community of fishes (primarily Kyphosids or sea chubs in this case) associating with flotsam. Note individuals tagged to determine movements between floating objects.

Fishermen of many other countries, including Japan, Indonesia, and India also take advantage of fish that collect beneath drifting materials at sea. Those fishermen moor rafts of bamboo, palm fronds, or other materials to attract fish.

At least a dozen floating objects differing in size, shape, and color will be moored in the waters off Costa Rica. They will include large objects fabricated from polypropylene cloth and with a surface area of 2,000 square feet, as well as smaller ones constructed of polyethylene cloth. Underwater, time-lapse cameras will be attached to the objects to obtain permanent photographic records of the fish which accumulate beneath the test objects. A small purse seine will be used to capture the smaller bait fish. Scientists also plan to tag individual fish to determine how long they will remain beneath an object, to make daily underwater estimates of the abundance of fish, and to record their behavior. According to a Bureau scientist, the major hazard is that sharks and marlin are also attracted to their objects as well as tuna. To avoid such hazards, a shark cage (for divers, not for sharks) into which divers can flee when sharks or marlin appear has been built for the divers by a San Diego firm.

United States Fisheries

ANADROMOUS FISHERY PROGRAM PLANNED:

Plans to start a new Federal program were announced by Secretary of the Interior Stewart L. Udall to conserve and develop the Nation's anadromous fishery resources. Anadromous fish, such as striped bass, salmon and shad, live in the ocean and return to fresh water during the spawning season.

The program could provide funds for research, stream improvement, and construction of fishways, spawning channels, and hatcheries.

The Anadromous Fish Act of 1965, authorized by Public Law 89-304, will be administered jointly by Interior's Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife.

Although funds have not yet been approved by Congress, the Act authorizes the appropriation of $25 million through June 30, 1970. The maximum Federal funds authorized for one year are $5 million, and no state may receive more than $1 million in one year. Federal funds would finance up to 50 percent of approved anadromous fish projects.

Both sport and commercial fishery resources are expected to benefit, and State agencies with jurisdiction over sport and/or commercial fisheries may enter into cooperative agreements with the Federal Government to carry out approved activities. States bordering the Great Lakes are eligible for funds for projects dealing with fish which leave the lakes to spawn in tributary streams. The Columbia River Basin--in Washington, Oregon, Idaho--is covered by another program and is excluded from the 1965 Act.

The Anadromous Fish Act provides for the participation of State fishery agencies and non-Federal interests--colleges, universities, associations, companies, and individuals--interested in helping to finance the projects.

Note: See Commercial Fisheries Review, January 1966 p. 48.

U. S. Vessels

ACCOMMODATIONS SURVEY:

A survey of accommodations on U. S. fishing vessels was conducted by the Interior Department's Bureau of Commercial Fisheries. Object of the survey was to determine to what extent those vessels could meet standards in the proposed draft Convention on Crew Accommodations on Board Fishing Vessels which will be up for adoption at the 50th International Labor Conference, Geneva, Switzerland, June 1-20, 1966.

The agenda of the Conference includes final consideration of a proposal for an international convention for minimum standards of accommodation on board fishing vessels. The proposed convention will very likely be adopted and sent to member nations for ratification.

The draft instrument which will be presented to the Conference for consideration would set mandatory minimum standards for crew accommodations aboard fishing vessels of 75 gross tons or more. Vessels from 25 up to 75 gross tons would be subject only when the national competent authority, after consulting with fishing vessel owners' and fishermen's organizations, determines that this is reasonable and practicable. Vessels which normally remain away from port for periods of less than 36 hours and in which the crew does not live on board would be exempt.

The draft instrument details specifications for sleeping rooms including size of bunks and lockers, sanitary accommodations including wash basins, tubs and/or showers, and specifications for galleys and mess rooms. These specifications would apply to all new or reconstructed fishing craft except the smaller exempt sizes.

The United States position on the proposed document has not as yet been finally determined. However, in discussions of this matter at the Conference, the Bureau desires that the U.S. delegation participate as actively as possible. In that connection the delegation desires information on the present status of fishing vessel accommodations in the United States fleet (i.e. vessels of 5 net tons or over).

In its survey the Bureau obtained information from a sample of about 800 vessels which is considered representative of the U. S. fishing fleet. Interviewers, staff members of the Bureau, contacted vessel owners or other persons with knowledge regarding accommodations on board fishing vessels during the period March 21-April 9, 1966.

* * * * *

NEW CUTTER COMMISSIONED FOR ALASKA DUTY:

The Coast Guard Cutter Confidence, the fourth of a new class of 210-foot rescue cutters, was commissioned February 19, 1966, at the Coast Guard Yard, Curtis Bay, Baltimore, Maryland.

A bow view of the new 210-ft. U. S. Coast Guard cutter, Confidence, taken at her mooring at the U. S. Coast Guard Yard, Curtis Bay, Md., before commissioning ceremonies on her flight deck commenced.

The Confidence is scheduled to be based at Kodiak, Alaska, where it will be used in law enforcement work as well as search and rescue. It was due to arrive at Kodiak in late May 1966.

The new cutter is equipped with a flight deck permitting landings and take offs of the Coast Guard's new turbine-powered "flying boat" rescue helicopters.

The Confidence has a capacity to tow ships up to 10,000 gross tons, and is equipped with twin propellers, each of which is powered by a combination diesel engine and gas turbine propulsion plant. It will have a sustained speed of 18 knots, and is designed to cruise for 5,000 miles at 15 knots.

The superstructure of the Confidence is arranged so as to permit 360-degree visibility from the bridge.

* * * * *

DOCUMENTATIONS ISSUED AND CANCELLED:

November 1965: During November 1965 a total of 51 vessels of 5 net tons and over was issued first documents as fishing craft as compared with 32 in November 1964. The number of documents cancelled for fishing vessels in November 1965 is not available.

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, November 1965 with Comparisons

Area (Home Port)	Nov. 1965	Nov. 1964	Nov.-Dec. 1965	Nov.-Dec. 1964
	. . . .(Number). . . .			
Issued first documents 2/:				
New England	2	3	34	32
Middle Atlantic	1	1	14	10
Chesapeake	8	3	46	39
South Atlantic	8	7	68	46
Gulf	22	11	275	205
Pacific	10	5	167	135
Great Lakes	-	1	2	3
Hawaii	-	1	-	2
Puerto Rico	-	-	1	2
Total	51	32	607	474
Removed from documentation 3/:				
New England	4/	9	4/	51
Middle Atlantic	4/	2	4/	26
Chesapeake	4/	1	4/	29
South Atlantic	4/	5	4/	54
Gulf	4/	13	4/	95
Pacific	4/	13	4/	140
Great Lakes	4/	1	4/	13
Hawaii	4/	-	4/	-
Total	4/	44	4/	408

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/There were 5 redocumented vessels in November 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 27 in 1965; 1 in 1964; 1 in 1962; 1 in 1961; 1 in 1959; 1 in 1956; 1 in 1954; and 18 prior to 1952.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
4/Not available.
Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

* * * * *

December 1965: During December 1965 a total of 56 vessels of 5 net tons and over was issued first documents as fishing craft as compared with 29 in December 1964. The number of documents cancelled for fishing vessels in December 1965 is not available.

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, December 1965 with Comparisons

Area (Home Port)	Dec. 1965	Dec. 1964	Jan.-Dec. 1965	Jan.-Dec. 1964
	. . . . (Number). . . .			
Issued first documents 2/:				
New England	4	1	38	33
Middle Atlantic	-	1	14	11
Chesapeake	10	-	56	39
South Atlantic	9	4	77	50
Gulf	24	16	299	221
Pacific	8	6	175	141
Great Lakes	1	1	3	4
Hawaii	-	-	-	2
Puerto Rico	-	-	1	2
Total	56	29	663	503
Removed from documentation 3/:				
New England	4/	2	4/	53
Middle Atlantic	4/	1	4/	27
Chesapeake	4/	-	4/	29
South Atlantic	4/	8	4/	62
Gulf	4/	11	4/	106
Pacific	4/	11	4/	151
Great Lakes	4/	1	4/	14
Total	4/	34	4/	442

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/There were 2 redocumented vessels in December 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 34 in 1965; 1 in 1964; 2 in 1963; and 19 prior to 1959.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
4/Not available.
Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE, UNDER QUOTA:

United States imports of tuna canned in brine during January 1-February 26, 1966, amounted to 9,620,930 pounds (about 458,140 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 130.4 percent from the 4,175,915 pounds (about 198,853 standard cases) imported during January 1-February 27, 1965.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1966 at the 12½-percent rate of duty has not been announced; however, in 1965 the quota was 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota were dutiable at 25 percent ad valorem, but total imports were below the quota in 1965.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, MARCH 1966:

Wholesale prices for fishery products (fresh, frozen, canned) in March 1966 were up 2.8 percent from the previous month. At 126.7 percent of the 1957-59 average, the overall index for edible fish and shellfish in March was higher by 17.0 percent as compared with the same month a year earlier. Prices this March, with few exceptions, were considerably higher than in the same month of 1965.

In the subgroup for drawn, dressed, or whole finfish, ex-vessel prices at Boston for large haddock in March 1966 dropped 19.3 percent from the previous month because of increased landings. As a result of light supplies, prices were up 1.1 percent for western frozen dressed halibut at New York City but compared with March 1965 they were higher by 19.8 percent. March prices were slightly lower for western frozen king salmon (down 0.9 percent), but were up 5.1 percent from the same month a year earlier. From February to March 1966, the subgroup index was down 4.2 percent, and 6.9 percent higher than in March 1965.

View looking north on South Street in the salt-water section of New York City's Fulton Fish Market.

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1966 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Mar. 1966	Feb. 1966	Mar. 1966	Feb. 1966	Jan. 1966	Mar. 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					126.7	123.2	124.5	108.3
Fresh & Frozen Fishery Products:					125.3	124.9	127.7	112.5
Drawn, Dressed, or Whole Finfish:					118.5	123.7	138.3	110.8
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.14	89.8	111.3	187.4	87.4
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.47	140.5	139.0	141.0	117.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.87	.88	121.2	122.3	122.3	115.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.71	.73	105.9	108.2	93.3	93.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.85	.85	139.1	139.1	122.8	139.2
Processed, Fresh (Fish & Shellfish):					129.4	130.5	128.3	112.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.39	.45	94.8	109.3	105.7	97.1
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.05	1.05	123.0	123.0	116.0	111.3
Oysters, shucked, standards	Norfolk	gal.	8.50	8.50	143.3	143.3	147.6	115.9
Processed, Frozen (Fish & Shellfish):					122.8	116.0	111.9	109.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.42	.42	106.4	106.4	101.4	95.0
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.39	.40	114.3	117.3	115.8	112.9
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	112.2	108.7
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.09	.98	128.6	115.6	110.3	108.5
Canned Fishery Products:					129.6	120.7	119.3	101.3
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.50	124.2	124.2	122.0	89.3
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	14.85	12.63	131.8	112.1	111.0	101.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.63	7.13	129.3	120.9	120.9	120.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	128.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Source: U. S. Department of Labor, Bureau of Labor Statistics.

The processed fresh fish and shellfish subgroup index dropped 0.8 percent from February to March 1966 mainly because of lower prices for fresh small haddock fillets at Boston (down 13.3 percent). Prices for other items in the subgroup were unchanged from the previous month. As compared with the same month a year earlier, the subgroup index this March was higher by 15.2 percent. Prices were considerably higher for South Atlantic fresh shrimp (up 10.5 percent) at New York City and for standard shucked oysters (up 23.5 percent) at Norfolk than in March 1965.

The March 1966 subgroup index for processed frozen fish and shellfish rose 5.9 percent from the previous month as a direct result of higher prices for frozen shrimp (up 11.2 percent) at Chicago. This was somewhat offset by lower prices for small haddock fillets at Boston which dropped 2.6 percent. The subgroup index this March was 12.4 percent higher than in the same month of 1965 chiefly because of substantially higher prices for frozen shrimp (up 18.5 percent) and frozen flounder fillets (up 12.0 percent).

The March 1966 subgroup index for canned fishery products rose 7.4 percent from the previous month. But prices for canned tuna were 17.6 percent higher because of the much stronger market due to light supplies and those for canned California jack mackerel were up 6.9 percent. Prices for canned pink salmon and Maine sardines were unchanged from February to March. As compared with the same month a year earlier, the index this March was 27.9 percent higher. Prices were sharply higher for canned pink salmon (up 39.1 percent) as a result of the very light 1965 pack and canned tuna (up 29.7 percent) than in March 1965. (U. S. Department of the Interior, Bureau of Commercial Fisheries, Market News Service.)

NEW FISHERIES IN MIDDLE ATLANTIC REGION

Important developments in the Middle Atlantic region include a decrease in two valuable commercial and sport fisheries--croaker and sea trout--and the growing importance of two new fisheries--tuna and swordfish. From nearly 58.5 million pounds of croaker (hardhead) taken in 1945, the commercial landings have fallen in recent years to less than 3 million pounds. The fishery for sea trout or weakfish has tumbled from 36.5 million pounds taken commercially in 1945 to 2 million pounds or less in recent years. The croaker decline is attributed by some to a series of cold winters with low water temperatures that the young fish cannot tolerate.

Nearly 6 million pounds of tuna (largely bluefin) were taken in the Atlantic ocean by U.S. fishermen and landed in Middle Atlantic Coast ports in 1964 as compared with 40,000 pounds just 2 years earlier. The region's growing tuna fishery is drawing purse seiners from as far away as the Pacific coast.

Swordfish

The fishery for swordfish (taken traditionally by harpoon) has increased markedly in the Middle Atlantic region in recent years as the fishery from New England waters expanded southward especially in the winter and spring and as the long-line fishing method was adopted.

--Conservation Note 17, The Big Bite, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington, D. C. 20240

U.S. DEPARTMENT OF THE INTERIOR
FISH & WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES

FISHING VESSEL SAFETY BULLETIN

REVISED FISHING VESSEL RULES OF THE ROAD - EFFECTIVE 1 SEPTEMBER 1965

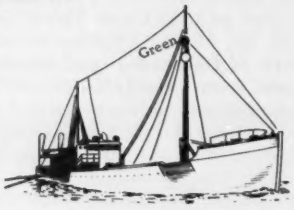
Important Changes in International Rules of the Road for Fishing Vessels:

LIGHTS DAY SHAPES SOUND SIGNALS

LIGHTS FOR VESSELS ENGAGED IN FISHING BY TRAWLING (DRAGGING DREDGE-NET OR OTHER GEAR THROUGH THE WATER)

GREEN over WHITE - OTTER TRAWLERS, CLAM DREDGERS, BEAM TRAWLERS, SCALLOP DREDGERS, OYSTER DREDGERS

GREEN-● ○

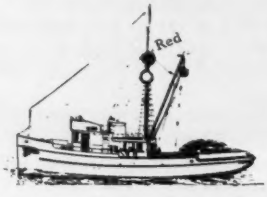


LIGHTS FOR VESSELS ENGAGED IN FISHING WITH LINES OR NETS EXCEPT TROLLING LINES

(Trollers should show only regular navigational lights.)

RED over WHITE - SEINERS, LINE TRAWLERS, HAND LINERS, GILL-NETTERS, LONG-LINERS, HARPOONERS

RED-● ○



Lights all around (32 points). Visible at least 2 miles. Vertical distance between lights not less than 4 or more than 12 feet.

DAY SHAPES FOR ALL VESSELS ENGAGED IN FISHING

Black shape consisting of two cones each not less than 2 feet in diameter with their points together one above the other, displayed where best can be seen. Visible at a minimum distance of 2 miles. Vessels less than 65 feet in length may substitute a basket for this shape.

SOUND SIGNALS IN FOG AND CONDITIONS OF RESTRICTED VISIBILITY

4-6 seconds — 1 sec. — 1 sec.

Vessels engaged in fishing when under way or anchored shall sound at intervals of not more than one minute, three blasts in succession, namely, one prolonged blast followed by two short blasts.

U. S. Coast Guard publication CG-169 contains the complete International Rules.

Note: See Commercial Fisheries Review, May 1965 p. 42.

International

FISH MEAL

MANUFACTURERS MEET IN CAPE TOWN, SOUTH AFRICA:

The Sixth Annual Conference of the International Association of Fish Meal Manufacturers was held in Cape Town, South Africa, April 25-29, 1966. Approximately 100 manufacturers of fish meal and fishery industry scientists from nearly 20 countries were expected to attend. Also expected at the Conference were a number of agents, brokers, and importers in the fish meal trade.

The Conference was postponed from its usual October dates in order that delegates might see the large and modern South and South-West African fish meal industries in full operation.

The private Association, which was formed in 1959, has members from 16 countries as follows: Belgium, Canada, Chile, Denmark, France, Germany, Holland, Iceland, Morocco, Norway, Peru, Portugal, South Africa, Sweden, United Kingdom, and the United States. It was anticipated that all countries would be represented. The U. S. Fisheries Attache for western Africa was also expected to attend. Representatives of the Fishmeal Exporters Organization (FEO), with which the Association cooperates closely on promotional and similar matters, were to be present, and observers from the fish meal industries of Japan, Mexico, Spain, and New Zealand were invited to participate.

Since 1960, the Association has worked in close cooperation with the Food and Agriculture Organization of the United Nations (FAO), which will again be represented at the Conference. Over the years the Association and FAO have continued to explore ways and means of developing fish flour (fish protein concentrate) for human consumption. An Association representative recently took part in an FAO Industry Steering Committee meeting set up by the Director General of FAO, to provide greater cooperation between industry and FAO in the Freedom from Hunger Campaign. Fish meal manufacturers internationally are becoming increasingly conscious of the important part they may play in combating malnutrition, not only in the development of fish protein concentrate, but because fish meal is an important ingredient in feeding poultry and pigs which are rapidly increasing in numbers in both developed and underdeveloped countries.

The Association's Executive Council and Scientific Committee endeavors to ensure orderly marketing of a product which is manufactured to uniformly high standards, and the exchange of much technical information. It is stressed that this is the primary objective of the Association, which is not concerned with matters of price or actual marketing. The Association has met in 14 different countries in the past 6 years. (International Association of Fish Meal Manufacturers, March 1966.)

NORTHWEST PACIFIC FISHERIES COMMISSION

JAPANESE INDUSTRY SEEKS EXTENSION OF CONVENTION

The Northwest Pacific Fisheries Commission (Japan-U.S.S.R.) held its tenth annual meeting in the Soviet Union in March 1966. In anticipation that the Commission might discuss the revision of the existing fisheries convention, which expires at the end of 1966, the Japan Fisheries Society in February held a special meeting to develop industry's position. The industry leaders shared the unanimous view that some changes in detail in the present treaty are desirable, but the treaty has performed a valuable role in protecting the resources and in maintaining an effective and orderly utilization of those resources. As such, Japan should not at this time press for changes in detail but should seek an extension of the present treaty. The Fisheries

International (Contd.):

Agency is reported to hold a similar view. (Suisan Tsushin, February 11, 1966.)

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JAPAN AND U.S.S.R. DIFFER ON STATUS OF KING CRAB RESOURCE IN NORTHWEST PACIFIC:

A sharp disparity in views on crab resource conditions marked discussions held between Japanese and Soviet fishery negotiators in Moscow.

The discussions began March 1 to fix a Northwest Pacific fishery agreement for 1966 under the Northwest Pacific Fisheries Commission. Two subcommittees were established: one for scientific and technical matters and the other for finances.

Soviet members of the scientific and technical subcommittees claimed that both Japan and the U.S.S.R. caught too many crabs in 1965, causing the size to diminish this year. They also said that crab resources as a whole have declined.

Japanese negotiators, on the other hand, termed the Soviet claim as unfounded and unacceptable. They pointed out that while Japan limited its crab fishing fleets last year to 4, the same as for 1964, the Soviet side increased its fleets from 6 to 7 and had a total catch amounting to 420,000 cases (48 ½-lb. cans) against the previous year's figure of 378,000.

Japanese catches last year totaled 240,000 cases as compared with the preceding year's 252,000 cases, they said.

The subcommittee was scheduled to take up the matter again.

The subcommittee completed discussions on herring resources. As soon as agreement was reached on crab resource conditions, it was to begin discussions on salmon resources. (Japan Times, March 8, 1966.)

Note: See Commercial Fisheries Review, April 1966 p. 53.

FOOD AND AGRICULTURE ORGANIZATION

FISHERY DATA CENTER ESTABLISHED:

A Fishery Data Center is being established by the Food and Agriculture Organization (FAO) in accordance with a resolution of the Intergovernmental Oceanographic Commission. Initially, the new Center will serve as a clearinghouse for data coming from the International Indian Ocean Expedition. Other international projects may be covered in the future. As planned, the Fishery Data Center would be a responsibility of the Fish Stock Evaluation Branch within the Fisheries Resources and Exploitation Division of FAO's Fisheries Department.

INTERNATIONAL WHALING COMMISSION

NORTH PACIFIC MEMBER NATIONS REVIEW AREA SITUATION:

Commissioners and advisers from the North Pacific Member Nations (Canada, Japan, U.S.S.R., and United States) of the International Whaling Commission met in Honolulu, Hawaii, February 14-17, 1966, to (1) discuss the possible threat of overfishing to the whale stocks in the North Pacific area and (2) to consider whaling regulations.

Fig. 1 - Japanese whale catcher in North Pacific.

The North Pacific Working Group of scientists met during the preceding week to review all available data on the condition of North Pacific whale stocks and to discuss stock assessments. The report of the Working Group was received by the Commissioners at their opening session and this report was used as the principal basis for their discussions. Careful consideration was also given to the proposals presented by each delegation.

Fig. 2 - Japanese whaling factoryship operating in North Pacific.

International (Contd.):

Fig. 3 - Flensing sperm whale aboard a Japanese factoryship in North Pacific.

It was found that there were large areas of agreement but the differences which remained prevented the adoption of any recommendations to the International Whaling Commission.

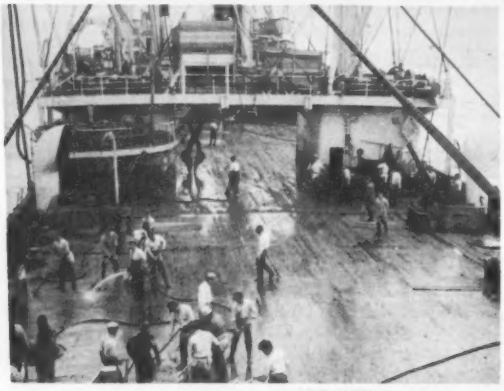

Fig. 4 - Washing the deck of a Japanese whaling factoryship.

It was agreed that additional stock assessments should be completed by the scientists as soon as possible and that a meeting of the Commissioners of the North Pacific Member Nations should be held the week prior to the 18th Annual Meeting of the International Whaling Commission to give further consideration to North Pacific whaling problems.

Argentina

FROZEN FISH INDUSTRY:

Argentina's frozen fish production consists primarily of fish fillet blocks with a small percentage of frozen whole fish. Annual production for the years 1962-64 was:

Year	Quantity
	Metric Tons
1964	7,888
1963	6,101
1962	1,933

There are four firms engaged in the fish block industry which utilizes mainly hake ("merluza"), otherwise called "Argentine whiting." In 1964, 3,473 tons of frozen fish were exported, of which 2,203 tons went to the United States. During 1965, one firm exported 1,501 tons of frozen fish blocks valued at $359,000, of which 1,245 tons, valued at $293,000, went to the United States. That same firm is planning to increase its fish production capabilities from 300 tons a month to 1,000 tons a month by June 1966. (U. S. Embassy, Buenos Aires, Argentina, January 26, 1966.)

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CRAB FISHING POTENTIAL:

Atlantic waters off the southern tip of Argentina are rich in fishery resources, one of which is the "Centolla" crab. This prized species is said to be as large as king crab.

Argentina hopes to develop a crab fishery modeled after the U. S. king crab fishery in Alaska. The Buenos Aires office of the Argentine National Territory of Tierra del Fuego is collecting information on this subject including: (1) the names of shipyards which build and outfit vessels for the Alaska king crab fishery, and (2) the names of companies which supply processing equipment for the king crab industry.

Development of the Argentine crab fishery could lead to sales and investment opportunities for U. S. firms. Tierra del Fuego is a Free Trade Zone, and machinery entering for use there is exempt from Argentine customs duties. Furthermore, most equipment recently entering Argentina for use in the development of the fishing industry has also been exempted from customs duties. (United States Embassy, Buenos Aires, February 19, 1966.)

Bulgaria

FISHERY TRENDS:

Bulgaria intends to fish the North Pacific, reports J. Nichol of the Vancouver (Canada) United Fishermen's Union. He spent 4 days in Bulgaria as a tourist in October 1966 and had a chance to meet "officers of the (Bulgarian) fishermen's trade union." The center of the Bulgarian fishing industry is at Burgas on the Black Sea. At present, Bulgaria has only 3 deep-sea stern trawlers (supplied by the U.S.S.R.), but by 1970 a fleet of 20 trawlers and 2 refrigerated fish carriers will be acquired (also from the U.S.S.R.). Nichol also learned that Bulgaria declared a 12-mile territorial limit off her Black Sea coast. (Fisherman, January 21, 1966.)

Note: See Commercial Fisheries Review, August 1965 p. 67; April 1964 p. 51.

Burma

U.S.S.R. ENDS JOINT FISHERY RESEARCH WITH BURMA:

The research vessel Akademik Knipovich, with a party of Soviet and Burmese scientists aboard, returned to the port of Rangoon after a ten-day cruise in the Andaman Sea and the Bay of Bengal. Joint research was conducted on the high seas (to determine the potential resources for high-seas fishing) and in Burma's coastal waters (where sea bottom life was studied). Soviets will inform the Burmese Government on the results of their research in the Indian Ocean.

Canada

PER CAPITA CONSUMPTION OF FISHERY PRODUCTS INCREASES IN 1964:

Canadian per capita consumption of fishery products increased from a total of 14.5 pounds (edible weight in 1963) to 14.9 pounds in 1964. Most of the gain was in fresh and frozen fishery products with consumption up from 9.4 pounds in 1963 to 9.8 pounds in 1964, and cured fishery products increased from 1.7 pounds to 1.8 pounds. But consumption of canned fishery products dropped from 3.4 pounds (net weight) in 1963 to 3.3 pounds in 1964.

Although consumption of fishery products increased, Canada reported even larger increases in 1964 per capita consumption of poultry (up 6.2 percent) and meat (up 4.0 percent). (Dominion Bureau of Statistics, Ottawa, Canada, January 1966.)

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ATLANTIC HERRING FISHERY CONFERENCE PLANNED:

An Atlantic Herring Fishery Conference was scheduled May 5-7, 1966, in Fredericton, New Brunswick, by the Canadian Federal-Provincial Atlantic Fisheries Committee.

A new awareness by the fishing industry of the potential of Canada's Atlantic herring resource, coupled with a rapidly expanding market for herring meal, herring oil, and herring as food for human consumption, are the main reasons for this initiative.

A number of papers were prepared for the Conference by scientists and technologists, Provincial and Federal fisheries authorities, fishing companies, and fishing vessel operators. The subjects included the herring resources of the Northwest Atlantic, current Canadian developments in the herring industry in the Atlantic coast Provinces, herring catching vessels and fishing gear, trends in the utilization of the species, and marketing and economic considerations. (Canadian Department of Fisheries, February 23, 1966.)

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NEW BRUNSWICK FISHERIES DEVELOPMENT PROJECTS FOR 1966:

A number of joint projects for further development of the New Brunswick fisheries in 1966 were announced on February 3, 1966, by the Federal Fisheries Minister and the Minister of Fisheries for that Province. Among the more important of these are projects for crab and shrimp fishing, herring exploration in the Gulf of St. Lawrence, and the development of a combination fishing vessel. The Fisheries Research Board of Canada and the fishing industry will participate in parts of the program.

Apparently there are good prospects for crab and shrimp fishing, and this year's work, to be carried out by chartered vessels, will determine the feasibility of the commercial exploitation of the stocks, attempt to develop processing techniques, provide instructors for processing, and evaluate the market.

Canada (Contd.):

The herring project is to demonstrate the feasibility of catching herring in the Gulf of St. Lawrence with the object of establishing a fish meal industry based on that species. An 80-foot purse-seiner will be used to fish in various parts of the Gulf, and arrangements will be made with existing plants to produce fish meal.

New types of gear and equipment to increase the efficiency of the dragger fleet will be introduced. This project calls for the conversion of a stern trawler for combination operations. Last year's demonstrations of the "Atlantic Western Trawl" developed by the Federal Department of Fisheries will be continued. The application of Scottish seine-netting techniques will be demonstrated on existing groundfish draggers.

Other Federal-provincial projects in New Brunswick will involve the development of a light-attraction system for sardines, with a view to increasing the production of weirs; the design and construction of an improved establishment for curing herring as "bloaters"; the demonstration of proper harvesting techniques and drying and packaging methods for Irish moss; improved methods of catching, processing, and packaging silver eel for European markets; and the introduction of new techniques to increase the catch of smelt. As in the past, technical assistance for all projects will be made available by the Industrial Development Service of the Federal Department of Fisheries. (Canada's Department of Fisheries, Ottawa, February 3, 1966.)

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NEW FISHERIES PATROL VESSEL FOR NOVA SCOTIA AREA:

A contract for the construction of a new Federal Department of Fisheries patrol vessel for the Canadian Maritimes Area has been awarded to a shipbuilding firm in Meteghan, Nova Scotia, the Federal Fisheries Minister announced February 25, 1966. The contract is for $134,248. The new 70-foot wooden patrol vessel is for the Department's Conservation and Protection Service and will replace the Limanda. The new vessel will be equipped with a 346-horsepower marine engine. She will be stationed at Digby, Nova Scotia, and will carry out patrol duties on the Nova Scotia side of the Bay of Fundy and the counties of Digby, Yarmouth, and Shelburne.

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FISHERIES TRADE MISSION TO AUSTRALIA AND NEW ZEALAND:

A Canadian fisheries trade mission left Vancouver, Feb. 23, 1966, for Australia and New Zealand. Recent Australian interest in buying frozen groundfish from Canada probably stimulated the mission. Australia and New Zealand are traditional customers for Canadian canned salmon and canned sardines. The 7-man mission includes representatives of the fisheries trade in Nova Scotia, New Brunswick, and British Columbia, as well as Government officials. (Canadian Department of Trade and Commerce, Ottawa, February 16, 1966.)

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NEWFOUNDLAND WHALING POTENTIAL TO BE SURVEYED BY JAPANESE VESSEL:

A Japanese whaling firm hopes to establish a whaling base in Newfoundland. The firm is reported to have reached an agreement with Canadian interests whereby it will operate a whaling vessel off Newfoundland to survey the possibilities, beginning in May 1966. The vessel, crewed by Japanese, will be chartered to Canada. Pending the outcome of the survey, a decision will be made on establishing a joint whaling operation in Newfoundland. It is reported that this arrangement was requested by Canada. The Japanese firm plans to employ the 754-ton Kyo Maru for the survey. (Nihon Suisan Shimbun, January 21, 1966.)

Canary Islands

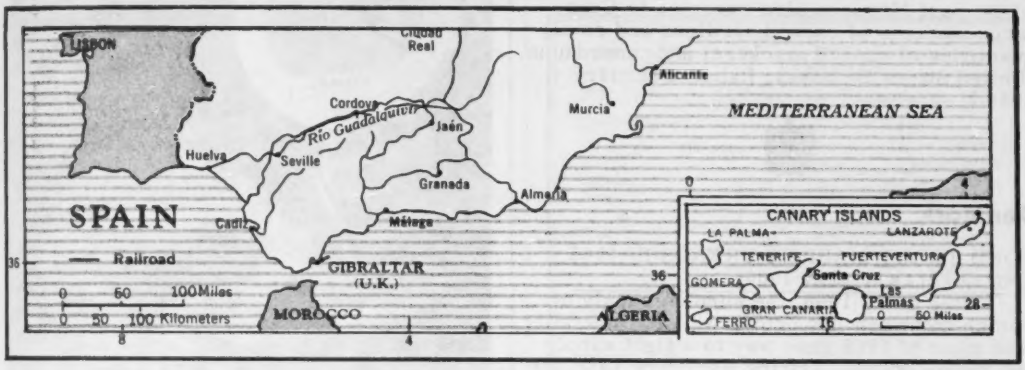
FISHERY ACTIVITIES:

While the Canary Islands include a total of seven islands, which together comprise two provinces of Spain (Tenerife and Gran Canaria), principal fishery activities are concentrated in three. Las Palmas, on the Island of Gran Canaria, is by far the most important fishing center, out of which operate some 145 vessels of all kinds. Next in importance is the port of Arrecife, on the Island of Lanzarote. Although there are some 191 fishing vessels operating out of that port, 182 are "pontones" (unpowered small boats), and their total production is not large. The third port is Santa Cruz, on the Island of Tenerife, at which 61 vessels are based, 52 of which are "pontones."

According to statistics issued by Sindicato Provincial de la Pesca de Las Palmas

Canary Islands (Contd.):

for the year 1963, the latest year available, landings at the three ports totalled 127,255 metric tons of all species. Exports of fishery products in all forms (fresh, frozen, dried, salted, canned, etc.) were 47,388 metric tons. Of that total, 28,636 tons went to mainland Spain, 6,167 tons to Italy (almost all frozen), 2,647 tons to Spanish Guinea (all dried), 2,213 tons to Congo-Brazzaville (almost all dried), 1,403 tons to Ghana (almost all dried), and the rest to 10 other African, European, and South American countries.



With regard to freezing and cold-storage facilities, there are 3 in Las Palmas, and 1 each at Arrecife and Santa Cruz. Storage capacity of the Las Palmas freezers is 8,000 tons in a rather old plant, 6,000 tons in a new plant recently opened, and 5,000 tons in a plant not quite completed but to be opened shortly. As a result of this marked increase in cold-storage space, storage rates have recently dropped from US$10 a ton to $5.50 a ton, an obvious benefit to the fishing industry.

Canneries for fish included until recently 8 in Las Palmas, 3 in Arrecife, and 3 in Santa Cruz. It is reported, however, that one of the Las Palmas canneries recently was closed and demolished to make room for a new hotel (an indication of the booming hotel business in Las Palmas and perhaps also an indication of the declining state of the tuna-canning industry in the Canary Islands). Although most of the canned tuna production goes to mainland Spain, some is also exported to Italy.

Other processing activities include a total of 16 fish meal plants (10 at Las Palmas and 3 each at Arrecife and Santa Cruz), all of whose production of about 18,000 metric tons annually goes to Spain; and 35 plants (26 at Las Palmas, 5 at Arrecife, 4 at Santa Cruz) producing salted and dried fish for export to Spain and several West African Countries.

Las Palmas has become an important base for the operation of Spanish and Japanese fishing vessels, but very rarely do other foreign vessels use this port. When they do, it is almost entirely for fuel or service. Although it was reported in January 1964 that Poland was planning the establishment of an operating base for fishing vessels in Las Palmas, those plans apparently did not materialize. There are at the present time estimated to be about 50 Japanese trawlers and 100 Japanese tuna vessels operating out of Las Palmas. The vessels are all refrigerated and will call at various West African ports for discharge of fish, but are based primarily at Las Palmas. Eight Japanese fishing companies maintain offices and resident representatives at Las Palmas. In addition to the trawlers and long-liners, a number of Japanese carrier vessels, with carrying capacities of up to 1,500 tons each, call at Las Palmas for transport of frozen tuna and trawl fish to Japan, Puerto Rico, and Mediterranean countries. According to one Japanese resident representative, Las Palmas is a good operating base because (1) labor is cheap, (2) transshipping can be accomplished without payment of customs or import taxes, (3) the climate is good year-round, and (4) recreation facilities for crews are good.

Note: See Commercial Fisheries Review, April 1964 p. 71.

Cuba

FISH MEAL IMPORTED FROM MOROCCO:

Morocco will export 4,000 metric tons of fish meal to Cuba in 1966. Those exports were included in a trade agreement signed between Morocco and Cuba in February 1965. In the past Morocco also exported to Cuba large amounts of canned sardines and small quantities of canned mackerel and canned tuna. (United States Embassy, Rabat, February 4, 1966.)

Denmark

POND TROUT MARKET TRENDS IN 1965 AND OUTLOOK FOR 1966:

During early 1966, the surplus supply of Danish trout and low prices which characterized most of 1965 gave way to a tight supply and rising prices. During February 1966, the price on all sizes of Danish trout rose about 9.9 U. S. cents a pound.

The available supply of Danish trout in February 1966 was not sufficient to meet export demands. This development was attributed to heavier than usual sales during the fall and severe winter weather which limited production.

During the last 4 months of 1965, Danish monthly pond trout sales were from about 800 to 900 metric tons, compared with about 600 to 700 tons in the same months of 1964.

The Danish supply of trout is expected to be somewhat less in 1966 than in 1965 when production reached a record of nearly 11,000 metric tons. The 1966 goals were probably set lower as a result of the surplus during most of 1965. Exports last year were a record 10,742 metric tons valued at US$10,143,000. Although the quantity exported in 1966 may not be as high, it seems most likely that the value of trout exports will set a new record.

Prices for Danish trout were not expected to drop even with the arrival of warm weather in the spring of 1966. The Lenten season was expected to exert an upward influence on prices. The minimum prices set on exports of certain trout products by the Danish Ministry of Fisheries on January 6, 1966, have in no way been responsible for the rising prices, according to reports from the trade.

The United States is a good market for Danish frozen trout taking 699 tons valued at $596,700 in 1965.

Weighing pond trout in a Danish plant. In Denmark there are more than 500 trout ponds.

The premiere of a film on the Danish pond trout industry was recently held in Esbjerg. The film will be used in promoting sales abroad and is available with English, German, French, and Italian commentary.[1/] (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, February 23, 1966.)

1/Requests for information about the film should be addressed to Erling Hulgaard, Fisheries Attache, Consulate General of Denmark, 280 Park Avenue, New York, N. Y. 10017.

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EXPERIMENTAL PRODUCTION OF ODORLESS, TASTELESS, EDIBLE FISH MEAL:

A Danish chemical engineer reports he has developed a process to produce odorless and tasteless fish meal by treating herring with an irradiation and enzymatic process. Apparently the product could be used for human food. A Danish patent apparently has been applied for. Research was financed by the inventor and West German capital. Ger-

Denmark (Contd.):

man and Norwegian fishery industries are interested in the process. A consortium has been formed in West Germany to finance development and use of the product.

The Technological Research Laboratory of the Danish Fisheries Ministry is unfamiliar with the new process and views the development with some reserve. (U. S. Embassy, Copenhagen, January 25, 1966.)

Ecuador

JAPANESE TUNA ENTERPRISE FAILS TO MATERIALIZE:

A Japanese firm planned to establish a joint tuna-fishing enterprise in Ecuador, to be located at Guayaquil. This information was based on an article in the Japanese periodical Suisan Keizai Shimbun of November 25, 1965. It has since been reported that this enterprise failed to materialize.

Note: See Commercial Fisheries Review, February 1966 p. 57.

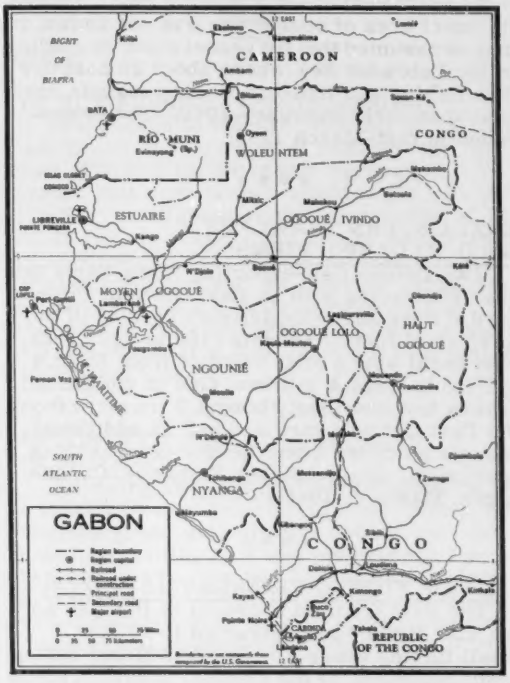
Gabon

ATLANTIC TUNA FISHERIES:

Tuna are found in the waters off Gabon in an area extending from the Equator south to Pointe Noire in the Congo (Brazzaville), extending up to 250 nautical miles from the coast. The species found are characteristic of those in the Gulf of Guinea: yellowfin tuna (Thunnus albacares), big-eyed tuna (Thunnus obesus), and skipjack (Katsuwonus pelamis). In addition to yellowfin and big-eyed tuna, Japanese fishermen with long-line gear have taken albacore (Thunnus alalunga) off Gabon.

There are no Atlantic tuna fisheries in Gabon, and the fishing industry in Gabon exploits to practically no extent the enormous resources of surface fish such as sardines and tuna. However, tuna are found off the coasts of Gabon.

Yellowfin tuna have been found in the southern part of the Gulf of Guinea off the coast of Gabon and also off the Islands of Annobon and São Tome. Fishing grounds are located from 2 to 10 nautical miles from the coasts of the islands and also in the area between them. The best season seems to be from November to March with the best periods being in November and February. It is estimated that it would take at least a year of trial fishing to gain information extensive enough to be of value to prospective fisheries.



The principal fishing firm located in Gabon has two trawlers which are not designed for tuna fishing. At present this firm is not known to have any plans to acquire tuna vessels. A French firm has indicated some interest in locating in Gabon, but does not intend to do so until the fishing possibilities off the coasts of Gabon have been more thoroughly explored.

There are no shore-based facilities available for handling tuna in Gabon. The nearest tuna facilities are in Pointe Noire, Congo. There are no plans to construct such facilities in Gabon at present.

No biological or technical research is presently being conducted by government installations on tunas. (United States Embassy, Libreville, February 21, 1966.)

East Germany

FISHERY RESEARCH IN THE NORTHWEST ATLANTIC:

East Germany's fishery research vessel Ernst Haeckel conducted a research cruise in the Northwest Atlantic in early 1966. Though its exact area of operations was not known, it may be assumed that the vessel made its studies in the Labrador Sea where about 20 East German fishing and fish-processing vessels operated in early February 1966. The cruise ended in mid-March 1966.

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SMALL STERN TRAWLERS SOLD TO DANISH FIRMS:

Two Danish fish-exporting firms early this year contracted with an East German shipyard at Rosslau for the delivery in 1968 of 20 to 25 steel fishing vessels (180 to 190 gross tons each) with a total value of from US$3.6 million to US$4.4 million. One of the Danish buyers had previously bought 3 trawlers from the East German yard and had 15 additional vessels on order when the new contract was concluded. (United States Embassy, Copenhagen, March 2, 1966.)

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SALE OF FISHING VESSELS TO SWEDEN:

The East German shipyard at Rosslau on the Elbe River has contracted to deliver 8 small fishing vessels to Swedish firms during 1966, according to the Swedish press. This is the same East German shipbuilder that contracted to deliver 20 to 25 small stern trawlers to Danish firms. Since 1964, the Rosslau shipyards have sold 29 small fishing vessels to Denmark, Sweden, and Tunisia.

Ghana

SOVIET FISHERY AID:

Soviet aid to Ghana's fisheries has been severely affected by the ouster of 130 Soviet technicians on March 1, 1966. The remaining 800-900 U.S.S.R. technicians (among them over 300 fishery technicians) were asked by the new Ghananian Government to leave by March 5, 1966. At that time, the Soviet Union was actively engaged in the following fishery projects: (1) construction of fish cannery, fish-smoking plant, fish-meal plant, can-making plant (all at Tema, Ghana); (2) delivery of medium and large trawlers; (3) training of Ghananian fishermen in the Soviet Union (over 120 as of August 1964) and aboard Ghana's fishing fleet; and (4) construction of fishing ports at Tema, and other cities. Other East European countries (Poland, Yugoslavia) also had extensive fishery aids and/or trade dealings with Ghana. It seems, however, that those countries will not be affected by the change in Ghana's Government. (New York Times.)

Greece

SOVIETS DELIVER STERN TRAWLERS TO GREECE:

Greece has ordered five large stern trawlers from the Soviet Union. The first of the five vessels was delivered in December 1965. The balance will be delivered during June-December 1966. The Greeks also have ordered three refrigerated transport vessels from Soviet shipyards. (Alieia, December 1965.)

Hong Kong

RECENT FISHERY TRENDS:

Fishery Trade: During 1965, the value of Hong Kong's imports of fish and fishery products amounted to HK$177 million (US$30.8 million) while the value of fishery exports reached only HK$74 million (US$12.9 million). Of the exports, HK$29 million (US$5 million) consisted of re-exports indicating a thriving local fish-processing industry.

Hong Kong Fish Sold on Domestic Markets, 1965

Type	Quantity
	Metric Tons
Fresh Marine Fish:	
Golden thread	9,671.6
Gareupa	813.6
Lizardfish	2,693.1
Red sea bream	516.6
Croaker	1,735.0
Yellow croaker	437.2
Mackerel scad	1,342.6
Anchovies	223.3
Others	33,489.7
Total Fresh	50,922.7
Salted and Dried Marine Fish:	
Anchovies	266.8
Croaker	296.8
Others	1,358.0
Total Salted	1,921.6
Grand Total	52,844.3

Hong Kong (Contd.):

Domestic Markets: In 1965, over 50,000 metric tons of fresh marine fish were marketed throughout the Crown Colony, about one-fifth consisting of the species golden thread (see table). Salted and dried products were not much in demand; less than 2,000 tons were sold.

Aid to Industry: At the end of 1965, about HK$1.7 million ($290,000) was advanced to Hong Kong's fishermen and fish-processing firms. (Special Supplement No. 4 to the Hong Kong Government Gazette, January 28, 1966.)

Hungary

FISH MEAL FROM PAKISTAN:

The Governments of Pakistan and of the Hungarian People's Republic concluded a trade agreement on February 8, 1966. Fish meal is listed among the Pakistani commodities to be exported to Hungary, but the quantities are not specified. (United States Embassy, Karachi, March 11, 1966.)

Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, DECEMBER 31, 1965:

Icelandic Export Stocks[1/] of Principal Fishery Products, December 31, 1965

Item	Quantity	Value	
	Metric Tons	Million Kr.	US$1,000
Groundfish, frozen:			
for export to:			
United States	1,621	42.1	977.7
Other countries	2,979	49.5	1,149.5
Stockfish	1,500	49.5	1,149.5
Herring, frozen	9,304	58.6	1,360.9
Industrial products:			
Fish meal:			
Herring	37,080	311.5	7,234.1
Other fish	1,349	10.4	241.5
Herring oil	46,856	379.5	8,813.3

1/Includes only stocks intended for export.
Note: Icelandic kronur 43.06 equal US$1.00.

As of December 31, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 1,621 metric tons, a gain of 611 tons from the stocks on hand November 30, 1965. (United States Embassy, Reykjavik, January 27, 1966.)

India

TO BUY FISHING VESSELS ABROAD:

In a speech to the fifth meeting of the Central Board of Fisheries at Bombay, the Indian Minister for Food and Agriculture reported that negotiations would begin with the U.S.S.R. and Japan for the importation of 10 or 15 fishing vessels and for the construction of facilities to process the catches. The Minister emphasized the possible expansion of India's fishing industry by pointing out that annual Indian fishery production is about 1.5 million metric tons against a potential of 10 million tons.

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EXPORTS OF FISHERY PRODUCTS INCREASING:

Freezing and canning fishery products is a relatively new industry in India. From the beginning, the industry has been export oriented, according to a new publication, the Seafood Trade Journal, first issued in January 1966 by the Seafood Canners' and Freezers' Association of India (Cochin). The first commercial shipment of frozen shrimp from India was made to the United States in 1953. By 1959, there were 7 Indian firms processing and exporting frozen or canned fishery products. The Association reports that there are now at least 14 freezing plants and 11 canning plants in India producing fishery products such as frozen and canned shrimp, frozen frog legs, and frozen lobster tails. India has become one of the leading suppliers of shrimp to the United States. India's total exports of frozen shrimp to all countries in-

India's Exports of Major Fishery Products, 1962-1965

Product	1965		1964		1963		1962	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000
Shrimp, frozen	7,028	8,742	5,870	6,652	3,967	4,475	2,238	2,284
Shrimp, canned	1,148	2,006	1,074	1,476	1,231	1,599	970	1,384
Lobster tails, frozen	111	269	41	78	53	66	40	48
Frog legs, frozen	443	568	332	348	514	674	391	485

India (Contd.):

creased from 5,870 metric tons in 1964 to 7,028 tons in 1965.

Ivory Coast

FISHERY LANDINGS, 1965:

The Ivory Coast fishing industry continued its upward trend in 1965, according to statistics released by the Fisheries Service. The Abidjan-based fleet of some 70 vessels (35 trawlers and 35 purse seiners) landed a total of 44,599 metric tons of fish and shellfish during 1965. This was 14.6 percent more than the 38,116 tons landed in 1964, almost exactly equal to the 14.2 percent annual increase projected in the GOIC's (Government of the Ivory Coast) economic development plans for this industry. It should be noted, however, that these plans call for an annual increase of only 6.8 percent for the next five-year period.

Among the 50-odd species landed at Abidjan, eight accounted for more than 1,000 tons each (see table).

Leading Species Landed at Abidjan, 1965

Common Name	Scientific Name	Quantity
		Metric Tons
Sardine	Sardinella aurita	4,318
Herring	Sardinella eba	13,113
Grunt	Brachydeuterus auritus	8,806
Jacks	Vomer, Chloroscrombrus sp.	1,067
Tuna, bonito and skipjack	Euthynnus, Auxis, Sarda, Katsuwonus sp.	1,989
Drum	Pseudotolithus senegalensis	2,930
Threadfin	Galeoides decadectylus	1,506
Soles	Cynoglossus, Solea sp.	1,090
Other	-	9,780
Total		44,599

Included were 145 tons of shrimp. Although production of shrimp for the first six months of the year exceeded that of the first half of 1964, total production for the year was somewhat less than the 160 tons caught in 1964. Aside from small quantities consumed locally, Ivory Coast shrimp is exported to France, some fresh by air and some cooked and frozen shipped by both air and sea.

Not included are tuna landings used by the small local cannery and for transshipment to Puerto Rico, Europe, and Japan. This industry continued its upward trend, accounting for 10,995 metric tons in 1965, plus an additional estimated 8,000 tons transshipped directly from tuna vessels to a refrigerated carrier.

Continuing its comprehensive plans for fishing industry development, the GOIC expects to shortly commence actual construction of the second quay in the new fisheries port at Abidjan. It was also expected that the end of March would see the announcement of the award of contracts for the construction of the new 3,000-ton storage capacity freezer plant and the new 50-ton-a-day tuna cannery. Later plans, the time of which is yet uncertain, include a can-making plant, byproducts or fish meal plant, and a fish-distribution system into the interior using rail and refrigerated truck facilities to serve nine interior population centers. (Regional Fisheries Attache, United States Embassy, Abidjan, March 15, 1966.)

Japan

TUNA LANDINGS IN YAIZU, FEBRUARY 1966:

February 1966 fish landings at the Japanese port of Yaizu (the leading tuna port), as tabulated by the Yaizu Fishery Cooperative

Yaizu Fish Landings by Species, February 1966 with Comparisons

Species	1966		1965
	Feb.	Jan.-Feb.	Feb.
	(Metric Tons)		
Tuna:			
Albacore	955	1,658	928
Skipjack	2,597	3,314	681
Other	5,978	11,655	6,081
Mackerel	4,410	4,632	446
Others	772	1,530	658
Total	14,712	22,789	8,794

Association, totaled 14,712 metric tons valued at 1,760 million yen (US$4.9 million). This was close to a twofold increase over February 1965 landings, which totaled 8,794 tons valued at 430.3 million yen ($1.2 million). The increase was primarily due to a tenfold increase in mackerel landings. (Suisan Keizai Shimbun, March 10, 1966.)

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TUNA FISHING TRENDS:

The Japanese Fisheries Agency reported in early March 1966 that in 1965 Japanese tuna long-liners operating within the proposed eastern Pacific yellowfin regulatory area

Japan (Contd.):

landed 21,610 metric tons of fish, of which 2,733 tons consisted of yellowfin tuna. In December 1965, 22 long-liners fished that area.

Good albacore tuna fishing had developed in February 1966 in the Atlantic Ocean off Recife, Brazil, in the area 30° W. longitude, 25°-30° S. latitude. Catches averaging 2.7-3 tons a day were being made by Japanese tuna long-liners which concentrated in large numbers in that area.

Good yellowfin fishing was reported in the Gulf of Guinea off West Africa in late February, with catches averaging 2.5-2.7 tons a day.

Prices of frozen tuna exported to the United States from Japan proper in early March 1966 were holding firm at US$500 a short ton for round albacore and $490-495 a short ton for dressed yellowfin, both prices f.o.b. Japan. Atlantic-caught yellowfin and albacore transshipped to the United States were bringing $495-500 a short ton, f.o.b. Las Palmas. Japanese observers were of the opinion that the good albacore fishing off Brazil might serve to check any further albacore price increases.

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TUNA FISHING OFF AUSTRALIA:

Three units of a Japanese fishing long-line fleet fished for tuna south of Tasmania in late 1965. The vessels, ranging from 123 to 136 feet long, each carry a 50-mile long-line to which are attached 2,000 hooks. The line is buoyed every 100 feet and is set 30 to 60 feet below the surface. It takes about 18 hours to retrieve the line which is shot once a day. The catch rate is understood to have been between 2 and 3 fish per 100 hooks, the tuna averaging between 50 and 200 pounds, with exceptionally large ones up to 500 pounds. The Japanese fleet, consisting of between 10 and 15 long-liners, was the same fleet that fished off the east coast of Tasmania in 1964. (Australian Fisheries Newsletter, February 1966.)

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EXPANDS TUNA PURSE-SEINE TEST FISHING OFF WEST AFRICA:

With the hope of establishing a new method of fishing tuna in the South Atlantic, experimental purse-seine fishing will be expanded off the coast of West Africa by a Japanese fishing firm. The experimental fishing will be done by a fleet of 3 purse-seine vessels, 1 refrigerated mothership, and 2 transport ships. Fishing tests will begin in June 1966 off the coast of Sierra Leone and Ivory Coast.

Tuna fishing with purse seines has been conducted on a small scale off the Sanriku coast of Japan, and full-scale deep-sea fishing operations were started in November 1964 off the coast of West Africa with the approval of the Fisheries Agency. Compared with long-line fishing (which has been the primary Japanese tuna-fishing method), it is reported that purse-seining has advantages in that: (1) It is easy to use instruments such as fish finders and (2) it is a more positive and efficient fishing method because it is possible to encircle a school of fish in a short time and obtain a large fish catch at a single cast of the net. If the experimental fishing operation proves successful, it will result in a major change in tuna fishing methods.

In the first experimental fishing operations (one purse-seine vessel, one mothership, and two transport ships) conducted by the company, the year's catch was only 4,000 metric tons of tuna and bonito. This was small considering the size of the fleet and the company lost money. As a result of this experimental operation, however, it was found: (1) the purse-seine method is more mobile than the long-line fishing method, and it is possible to conduct fishing operations in waters with abundant resources and closer to the coast; (2) the fishing grounds off the coast of Sierra Leone and Ivory Coast have abundant resources, and moreover, as seaweed grows thickly in comparatively shallow water, purse seining is more practical; and (3) as the tidal currents are swifter than in Japanese waters, it is necessary to strengthen the nets.

By improving fishing gear and methods based on the experience from the first experiments, and by increasing catches with additional purse-seine vessels, the company believes the operation can be made profitable and has, therefore, decided to proceed with this second experimental operation. (Nihon Keizai, February 20, 1966.)

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Japan (Contd.):

POWER REEL TO SAVE LABOR ON TUNA VESSELS:

Since early in 1965, one of Japan's leading tuna-fishing companies has employed its vessel, the 99-ton long-liner Hatsuhi Maru, to test a power reel to save on labor. From January 25 through February 20, 1966, the vessel conducted a second series of tests of the reel on the Southern Pacific fishing grounds near Ponape Island (between the Caroline and Marshall Islands). The crew was reduced to 15 from the normal complement of 20. About 250 baskets of gear were used. This is about two-thirds the amount ordinarily used on a vessel of this size. The daily catch of big-eyed, yellowfin, and other species of tuna averaged around 2 to 3 metric tons, which is about the same as that taken by an ordinary vessel. Fishermen's organizations expressed concern that this would result in a drop in labor demand and reduce employment. The fishing department of the company reported, however, that the crew of the Hatsuhi Maru was pleased with the new method, especially since it did away with the arduous task of handling the lines. It was reported that the company plans to use the power reel on 2 of its 250-ton vessels, the Azuma Maru Nos. 15 and 26. Eventually the company was expected to convert its 30 or more tuna long-liners to the reel method of handling the gear. A number of other Japanese companies were reported also making the conversion. The president of one other company said that of their total of 13,500 gross tons of tuna vessels, the operations of about 3,500 tons of unprofitable vessels (especially those operating in the Atlantic) were to be ended and on the remainder such labor-saving devices as the power reel would be employed. (Suisan Tsushin, February 22, 1966.)

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LABOR-SAVING DEVICES BEING ADOPTED BY TUNA-FISHING FIRMS:

A Japanese fishing company, beginning in June 1965, embarked on a two-year plan to modernize its 16 tuna long-line vessels so as to reduce operating costs. To date, that firm is reported to have installed labor-saving equipment (consisting of a new method for setting and hauling long-line gear) on 3 vessels, ranging in size from 484-697 gross tons, and has succeeded in reducing manpower requirements from about 32-33 men to 25-26 men per vessel. The saving in labor is estimated to total nearly one million yen (US$2,778) a man, or equal to 5-6 million yen ($13,889-16,667) per vessel.

Another major tuna-fishing company has dispatched the 300-ton tuna long-liner Einin Maru on a six-month fishing cruise to test the labor-saving devices installed on that vessel. In addition, that vessel will experiment with freezing fish by "hanging" instead of plate freezing, the usual method. Through mechanization of operations, the size of the crew on the Einin Maru is said to have been reduced by about 7 men to 20. If the fishing trials prove successful, the firm plans to gradually adopt the new methods on all its long-liners. (Shin Suisan Shimbun Sokuho, March 12, 1966.)

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TESTING VERTICAL LONG LINE:

For some time the Kanagawa Prefectural Fisheries Experimental Station, Misaki, has been studying the vertical long line for fishing tuna. The research vessel Sagami Maru, was conducting experiments in late February 1966 in waters nearby with 20 baskets of gear. In May, the amount of gear was to be increased to 30-50 baskets. Ultimately as many as 200 baskets will be used to test tuna fishing to depths of 100 to 150 fathoms. Also in May, another vessel, the Enoshima Maru, was to be equipped with the gear to conduct trials in the Sanriku area and to see if this fishing could serve as a possible supplement for the mackerel pole-and-line vessels of that district. (Suisan Tsushin, February 25, 1966.)

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FISHING COMPANIES SHOW DEFICIT IN TUNA OPERATIONS:

Financial statements released by some Japanese fishing firms for the business year 1965 indicate that a number of them lost money in their tuna operations despite a 50- to 60-percent increase in sales (due to the rise in tuna prices) as compared with 1964. Japan's leading fishing firm reportedly grossed 110 billion yen (US$333 million) in total sales and netted a profit of over 7 billion yen ($19.4 million), but lost 300-400 million yen ($0.8-1.1 million) in its tuna operations. Another major company is reported to have lost over 500 million yen ($1.4 million) from its tuna operations. Due primarily to this loss, that firm is said to be unable to pay any dividends

Japan (Cont.):

to its stockholders this year, although previously it had regularly declared a 6-percent dividend.

The Japanese firms reportedly anticipate a good year in 1966 in view of the growing worldwide demand for tuna and market conditions, and are planning on making substantial investments to reduce vessel operational costs through adoption of labor-saving devices. (Suisan Tsushin, March 7 & 11; Minato Shimbun, March 10, 1966.)

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FROZEN TUNA EXPORT MARKET OUTLOOK IN 1966:

The Japan External Trade Promotion Organization (JETRO), in a report on the future of Japanese frozen tuna exports, stated that the outlook in 1966 is bright in view of the growing demand for tuna in the United States. The report stressed the importance of lowering production costs and selling better quality tuna at higher prices, rather than increasing production. To achieve this, the report points out the need to: (1) modernize production facilities; (2) develop positive measures to rationalize management; and (3) establish a thorough and orderly export system in line with export market trends.

According to that report, Japanese tuna production reached a peak in 1962 and thereafter began to trend downward, but albacore catches have been increasing annually. Frozen tuna validated for export in 1965 totaled 154,000 metric tons (4-percent increase over 1964), valued at US$53,973,000 (1-percent decrease from 1964). Some noteworthy developments in 1965 were the general improvement in frozen tuna exports to Europe and Africa; the generally stagnant tuna market in the United States and Canada; increased catches of albacore and skipjack and the decline in the yellowfin catch; soft market conditions in the first half of 1965 and improvement observed in the latter half of that year.

The report added that the 3- to 4-percent increase in U. S. canned tuna demand in 1965 as against 1964 and the current canned tuna production situation in the United States provide a bright outlook for Japanese frozen tuna exports in 1966. However, it concluded that no significant increase in exports can be expected in view of the declining productivity of the Japanese tuna fleet, reduced profits for vessel owners due to rising operating costs, and growing international competition. (Nihon Suisan Shimbun, March 9, 1966.)

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FROZEN TUNA EXPORTS TO U. S. AND PUERTO RICO, DECEMBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico increased in December 1965 as compared with the previous month. Exports to the United States proper almost doubled in quantity while the value was 2½ times that in October. The increases in exports to Puerto Rico were proportionately not quite as large. (Fisheries Attache, United States Embassy, Tokyo, March 15, 1966.)

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, Nov.-Dec. 1965

Species	1965 December Qty.	1965 December Value	1965 November Qty.	1965 November Value
	Short Tons	US$ 1,000	Short Tons	US$ 1,000
Albacore:				
United States	846	349	539	175
Puerto Rico	1,525	515	1,096	351
Total	2,371	864	1,635	526
Yellowfin:				
United States	877	325	290	94
Puerto Rico	930	231	135	28
Total	1,807	556	425	122
Big-eyed:				
United States	-	-	-	-
Puerto Rico	102	25	-	-
Total	102	25	-	-
Skipjack:				
United States	-	-	-	-
Puerto Rico	1,181	173	1,127	156
Total	1,181	173	1,127	156
Other:				
United States	-	-	-	-
Puerto Rico	-	-	73	15
Total	-	-	73	15
Total United States	1,723	674	829	269
Total Puerto Rico	3,738	944	2,431	550
Grand total	5,461	1,618	3,260	819

Source: Japan's Bureau of Customs.

SKIPJACK TUNA MARKET GOOD:

Japanese frozen tuna exporters are estimated to have contracted for export to the United States for about 2,500 short tons of skipjack tuna during the period early February-early March 1966. During that same

Japan (Contd.):

period, the f.o.b. export price for skipjack climbed from US$290 a short ton to $347.50, but subsequently declined to $342.50 (said to be equal to about $390 a ton, c.i.f.).

The ex-vessel price in Japan of frozen skipjack suitable for export ranged from 105-115 yen a kilogram ($264-290 a short ton). Frozen tuna exporters were buying skipjack from such far-away points as Makurazaki, Kagoshima Prefecture (over 1,000 miles by rail from Shizuoka Prefecture). Skipjack fishing was good, with 300-400 metric tons being landed daily.

Beginning in late February, Japanese tuna packers were showing lively interest in canning skipjack in brine and in oil, paying 90-95 yen a kilogram ($227-239 a short ton) for their supplies. The packers' interest in packing skipjack heightened following the establishment by the Tokyo Canned Tuna Sales Company on March 9 of a check-price of $9.95 a case for lightmeat tuna in brine, an increase of one dollar a case over the previous price. (Suisan Tsushin, March 10, 1966.)

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EXPORTS OF CANNED TUNA, JANUARY-OCTOBER 1965:

During October 1965, Japan exported 4,400 metric tons of canned tuna (in oil and brine) valued at US$3.7 million. From January through October 1965, total exports of canned tuna amounted to 34,700 tons valued at $28.6 million. This canned tuna was sold in 77 countries, of which the United States, West Germany, and Canada were the leading markets. Their combined purchases accounted for 78 percent of all canned tuna shipped and 80 percent of the total value. Canned tuna amounting to 15,000 tons, valued at about $14 million, was exported to the United States. The shipments to the U. S. accounted for 43 and 48 percent, in quantity and value, of the total exports of Japan's canned tuna. (Fisheries Attache, United States Embassy, Tokyo, January 25, 1966.)

Japan's Exports of Canned Tuna, January through October 1965, by Country of Destination
(Quantity in Metric Tons--Value in $1,000)

Product	United States		Canada		All Other Countries		Total	
	Oct.	Jan.-Oct.	Oct.	Jan.-Oct.	Oct.	Jan.-Oct.	Oct.	Jan.-Oct.
Albacore (in oil):								
Quantity	-	152.9	209.4	2,137.2	145.9	2,062.4	355.3	4,352.5
Value	-	149.5	193.0	1,917.6	123.7	1,703.1	315.7	3,770.2
Albacore (in brine):								
Quantity	1,354.6	12,066.0	-	50.4	-	-	1,354.6	12,116.4
Value	1,321.4	11,615.9	-	47.1	-	-	1,321.4	11,663.1
Albacore (in jelly or tomato paste):								
Quantity	-	-	3.3	28.8	5.9	55.1	9.2	83.9
Value	-	-	2.7	23.2	4.6	43.6	7.3	66.8
Tuna (in oil) 1/:								
Quantity	-	2.5	-	19.4	293.5	2,953.8	293.5	2,975.7
Value	-	3.9	-	18.5	251.5	2,273.0	251.5	2,295.4
Tuna (in brine) 1/:								
Quantity	44.7	189.5	-	-	-	2.2	44.7	191.7
Value	38.0	156.0	-	-	-	2.5	38.0	161.1
Bonito (in oil):								
Quantity	0.3	0.3	-	-	1,160.1	5,467.0	1,160.4	5,467.3
Value	0.2	0.2	-	-	952.9	4,173.9	953.1	4,174.1
Bonito (in brine):								
Quantity	279.5	2,588.0	-	-	9.8	20.6	289.3	2,608.6
Value	215.1	1,992.3	-	-	7.8	15.8	223.0	2,008.1
Tuna (in jelly or tomato paste) 2/:								
Quantity	-	6.7	-	0.2	85.0	543.3	85.0	550.2
Value	-	5.2	-	0.1	52.5	331.7	52.5	337.0
Other tuna and bonito:								
Quantity	17.1	64.7	1.8	16.0	818.9	6,272.5	837.8	6,355.2
Value	16.1	51.4	1.3	13.5	544.8	4,085.0	562.7	4,149.9
Total quantity	1,696.2	15,070.5	214.5	2,254.0	2,519.1	17,377.1	4,429.8	34,701.6
Total value	1,590.6	13,977.1	196.0	2,020.0	1,936.3	12,628.5	3,725.2	28,625.6

1/Excluding albacore.
2/Excluding albacore and bonito.

Licenses for 5 Japanese fishing companies to process (can) king crab in the eastern Bering Sea during the 1966 season have been issued by the Japanese Fisheries Agency. The 5 companies will operate jointly with the factoryship Dainichi Maru (5,859 gross tons). The factoryship departed from Japan on March 1, 1966. The mothership has a fleet of 9 "Kawasaki" vessels (portable launch-type vessels or skiffs) and 5 catcher boats. The 1966 season operations were licensed for March 1 to December 31, 1966. It is anticipated, however, that the operations will probably be completed before the expiration

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FROZEN SWORDFISH EXPORT VALIDATIONS TO THE U. S. AND CANADA, APRIL-DECEMBER 1965:

Japanese export validations of frozen broadbill swordfish (fillets, chunks, and "other" forms) to the United States and Canada in December 1965 totaled 422 short tons valued at US$300,319. This compared with validations of 363 tons valued at $278,753 for November 1965 and 469 tons valued at $307,860 in December 1964.

For the 9 months April-December 1965, Japan's export validations of frozen swordfish to United States and Canada totaled 3,536 tons valued at $2.6 million. Fillets accounted for 64 percent of the total, with the remainder made up of chunks and other forms. For the same 9 months in 1964, the frozen swordfish export validations totaled 2,962 tons valued at $1.9 million. (Fisheries Attache, United States Embassy, Tokyo, Feb. 24, 1966.)

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KING CRAB MOTHERSHIP LICENSED TO OPERATE IN EASTERN BERING SEA:

Japan (Contd.):

"Kawasaki" vessel or skiff used to take lines and supplies from the mothership to the catcher boats.

date of the licenses. (Fisheries Attache, United States Embassy, Tokyo, March 7, 1966.)

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HERRING WILL BE IMPORTED FROM U.S.S.R. IN 1966:

As a result of consultations with the Hokkaido Government, the Hokkaido Fishermen's Federation, and the Aomori Prefectural Government, the Japanese Fisheries Agency decided to import 4,500 tons of Soviet-caught herring in 1966 (4,000 tons last year) and to allocate 4,300 tons to Hokkaido and 200 tons to Aomori Prefecture. As in 1965, the Herring Import Project Association will purchase herring at sea and deliver them to the Hokkaido Fishermen's Federation. The Federation will produce dried herring and herring roe.

Importation of Soviet-caught herring was started in 1960 to allow fishermen in Hokkaido to process herring to make up for poor catches. However, since Aomori Prefecture is exporting apples to the Soviet Union in a barter trade for herring (exports last year were 2,000 tons), the Aomori Prefectural Government demanded and was granted an allocation of herring. (Asahi, Mar. 19, 1966.)

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EXPORTS OF FROZEN RAINBOW TROUT, DECEMBER 1965:

Japan's exports of frozen rainbow trout in December 1965 increased as compared with the previous month--about 18 percent in quantity and about 23 percent in value. There were substantial increases in exports to the United States, the United Kingdom, Canada, and the Netherlands. Exports to Belgium dropped considerably. (Fisheries Attache, United States Embassy, Tokyo, March 15, 1966.)

Japan's Exports of Frozen Rainbow Trout by Country of Destination, December 1965

Destination	Quantity	Value
	Short Tons	US$
United States	117	88,512
United Kingdom	22	14,145
Belgium	7	5,081
Canada	22	17,678
Netherlands	10	7,575
Other	3	2,796
Total	181	135,787

Source: Japan's Bureau of Customs.

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EXPORTS OF MARINE PRODUCTS, OCTOBER 1965:

Japan's exports of marine products in October 1965 consisted principally of fresh and frozen fish valued at over $6 million and canned products valued at almost $12 million.

Japan's Exports of Marine Products, October 1965

Product	Quantity	Value
	Metric Tons	US$ 1,000
Fresh & frozen:		
Tuna, skipjack	946	167
Tuna, other	11,814	3,872
Marlin	621	586
Sea bream	251	55
Mackerel	399	67
Saury	386	117
Salmon	31	50
Other fish	3,093	1,255
Total fresh & frozen	17,541	6,169
Cured:		
Cod	5	6
Boiled and dried	56	25
Shark fins	96	158
Other	22	22
Total cured	179	211
Shellfish, etc., frsh., froz., dried:		
Scallops	1	6
Oysters	13	14
Shrimp	169	328
Squid	1,740	519
Octopus (fresh)	41	19
Whale meat	2,219	500
Frog legs	94	161
Other	30	39
Total shellfish, etc.	4,307	1,586
Canned:		
Salmon	2,988	3,945
Tuna, skipjack	1,450	1,175
Tuna, other	2,057	1,933
Mackerel	2,710	969
Saury	65	33
Sardine	55	28
Horse mackerel	422	150
Other fish	1,758	1,306
Crab	487	1,394
Shrimp	121	253
Squid	325	136
Other shellfish	787	647
Total canned	13,225	11,969
Other products:		
Seaweed, Kombu	86	53
Agar agar	32	119
Seaweed, laver 1/	241	6
Whale oil (baleen)	7,300	166

1/In 1,000 sheets.

Japan (Contd.):

(Fisheries Attache, United States Embassy, Tokyo, Feb. 16, 1966.)

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FOREIGN TRADE IN FISH MEAL UP IN 1965:

Japanese foreign trade in fish meal in 1965 was valued at US$18,447,135, of which $16,381,269 were imports, with exports valued at $2,065,866. Japan's imports of meal in 1965 increased 21 percent in value over the previous year. Export values increased from $834,000 in 1964 to $2,065,866 in 1965. The sharp increase in exports is attributed to good demand and high prices in overseas markets.

Table 1 - Japan's Exports of Fish Meal by Country of Destination, 1965

Country of Destination	Qty.	Value
	Metric Tons	US$
Ryukyu Islands	1,245	202,215
Taiwan	2,229	324,839
Hong Kong	355	54,216
South Vietnam	26	3,819
Fed. of Malaya	380	60,210
Singapore	995	151,470
Philippines	6,708	1,053,120
Ceylon	304	53,100
West Germany	600	125,400
Brazil	1	600
So. Africa Republic	210	36,680
Mariana Islands	1	197
Total 1965	13,054	2,065,866
Total 1964	6,202	834,000

Source: Japan Oils and Fats Export and Import Association.

During 1965, the principal suppliers were, in order of importance, Peru, Republic of South Africa, South-West Africa, and the U.S.S.R. Approximately 50 percent of meal imports were supplied by Peru. The most important export market was the Philippines with purchases valued at $1,053,120, or about 50 percent of the total export value. (Fisheries Attache, United States Embassy, Tokyo, March 22, 1966.)

Table 2 - Japan's Imports of Fish Meal by Country of Origin, 1964 and 1965

Country of Origin	1965		1964	
	Quantity	Value	Quantity	Value
	Metric Tons	US$	Metric Tons	US$
Communist China	2,061	328,844	99	15,294
United States	973	133,967	1,429	187,112
U.S.S.R.	6,734	1,007,739	-	-
Argentina	198	22,561	126	12,794
Repub. of So. Africa	32,516	4,753,703	15,741	2,140,052
Peru	57,972	8,221,781	83,474	11,127,675
Australia	-	-	133	12,711
South-West Africa	10,693	1,679,144	711	96,400
Hong Kong	1/	503	-	-
North Korea	504	82,258	-	-
Samoa	-	-	281	42,203
Angola	993	150,769	-	-
Thailand	-	-	30	3,850
New Zealand	-	-	253	25,402
Total	112,644	16,381,269	102,277	13,663,493

1/Quantity not reported.
Source: Japan Oils and Fats Import and Export Association.

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CONTRACTS FOR SALE OF ANTARCTIC WHALE OIL:

Export contracts for a total of 32,000 metric tons of Antarctic whale oil produced by three Japanese whaling companies have been concluded with British, Dutch, and other European companies. The highest price is US$258 a ton for 6,000 tons to the Dutch company (delivery at leading ports in Europe). In all contracts, the price is at least $252, the highest for the past few years. Under the new contracts the average export price (delivery at port to be designated by the buyer) is about $14-20 a ton higher than the average price in 1965. This is attributed to an improvement in the world oil market and the prospects of decreased production due to a cut in the catch quota in Antarctic whaling.

In 1966, Japanese production of Antarctic whale oil is expected to be 5,000 to 6,000 tons below the planned production of 47,000 (40,000 tons being allocated for export). The decrease in production is expected to occur because the three whaling companies put emphasis on the catch of baleen whales rather than fin back whales (from which oil is obtainable in the largest quantity) due to a good demand for whale meat. The Japanese export quantity of whale oil for 1966 is estimated to be 31,000 to 33,000 tons, after deducting 9,000-10,000 tons allocated for domestic use, or less than one-half of the actual export quantity (72,000 tons) in 1965. (Nihon Keizai, Feb. 15, 1966, and The Japan Economic Journal, Feb. 22, 1966.)

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EXPLORATORY FISHING OFF AUSTRALIA:

Australian observers joined the Japanese fisheries vessel Sugura Maru during an exploratory fishing cruise off the southern and western Australian coasts in November 1965.

The Sugura Maru of 350 tons is under charter to the Japanese Fishing Agency. She has a crew of 24 and is equipped with a comprehensive array of fishing gear, including demersal long lines, drift nets, traps, beam trawls, and long lines.

Japan (Contd.):

Bottom long-lining was carried out in varying depths to about 100 fathoms. As much as three miles of line was set at different stations along the coast. Twenty stations were fished in this manner during the voyage.

Whale shark of many species constituted the bulk of the catch. These were headed, gutted, and frozen for eventual processing into fish sausage in Japan.

Small snapper up to 18 inches long, which are frozen whole and served in Japanese restaurants as whole fish, were most sought after, but the snapper fishing was not particularly good--certainly not in commercial quantities.

A trammel net was set for shrimp in 42 fathoms west of Shark Bay. Although the net was badly damaged by shark, two king shrimp were caught. One Australian observer said this could be an indication that the shrimp in Shark Bay, on reaching a certain stage of maturity, migrate to deeper waters on the Continental Shelf.

In Cambridge Gulf, dredging with a modified scallop dredge had poor results. (Australian Fisheries Newsletter, February 1966.)

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WEST AFRICAN TRAWLERS CHANGE FISHING POLICY:

Exports of fish caught by Japanese pelagic trawlers off the coast of West Africa have been decreasing sharply due to the changing business policy of operator fishing firms.

Because of a marked advance of domestic prices of frozen fish caught off the coast of West Africa, Japanese trawlers operating off the African coasts have begun to attach top importance to catching "high-grade" fish for Japanese consumption in preference to "low-grade" fish they used to catch for "spot exports" to coastal African countries, such as Ghana, Nigeria, Liberia, and Sierra Leone, and to European customers, including Italy and Greece.

This trend has become particularly noteworthy since the summer of 1965 especially as regards the "Big 2" fishing firms. Those two companies have reduced the volume of spot exports from catches in West African waters by around 60 percent. As a result, nearly 80 percent of the total catch by their trawlers operating off the West African coasts have been brought back to Japan lately.

Japanese fishing circles ascribed this new tendency to the following reasons:

(1) High-grade fish brought back to Japan are sold on the Japanese market at an average price of 150,000 yen (US$417) a ton. The price has been rising annually by 10 percent.

(2) In contrast, the average export price of low-grade fish bound for coastal countries has remained low, about 60,000 yen ($167) a ton. No price advance in the future is likely due to competition by other fishing countries, such as Poland and the Soviet Union.

(3) Payment by coastal countries for fish purchases is not regular due to foreign currency scarcity. (Japan Economic Journal, Feb. 15, 1966.)

日本

Jordan

FISHERY TRENDS IN 1965 AND OUTLOOK FOR 1966:

No gains were realized in Jordan's underdeveloped fishing industry during 1965, and the outlook for 1966 reveals no plans for increasing production. Nevertheless, it is significant that Jordan acquired 19 kilometers (11.8 miles) of coastline in a land swap with Saudi Arabia, making Jordan's coastline approximately 25 kilometers (15.5 miles) long. This might spur individual fishermen to increase catches in the new coastal waters, but no significant steps have been taken to add to the industry's capacity. The main obstacle seems to be Jordan's inability to secure agreement with Saudi Arabia to allow use of

Jordan (Contd.):

the latter's territorial waters for periods longer than one year. Saudi Arabia continues to supply the major portion of Jordan's fish import needs.

The development potential of Jordan's fishery resources has long been recognized by the Jordan Government. It was given explicit recognition in the new Seven-Year Plan. The Government of Jordan would be interested in receiving suggestions and participation from United States and other interested parties for the improvement and expansion of its fishing industry. The Jordan Government has requested technical assistance from the United Nations Special Fund for its deep-sea fishing project in Aqaba but no response had been received as of March 1966. The Fund had previously provided an advisor to carry out a survey on inland fishing, the results of which should be available during 1966. (United States Embassy, Amman, March 18, 1966.)

Republic of Korea

BUREAU OF FISHERIES ESTABLISHED:

The Republic of Korea will establish a Bureau of Fisheries, stated Korean President Chon Hui Pak in a "State of the Nation" speech to the National Assembly on January 18, 1966. The main functions of the new Bureau will be the enactment of a basic law on fisheries, the improvement of fishing techniques, and the development and expansion of Korean fisheries. (U. S. Embassy, Seoul, January 21, 1966.)

Liberia

ATLANTIC TUNA FISHERIES:

The tuna species found off the Liberian coast include skipjack, yellowfin, big-eyed, and albacore. Fishing areas for all those species are about 20 miles offshore. Skipjack and yellowfin are caught in that area in great abundance. Principal and minor grounds are not known, but it is known that all tuna fishing grounds are offshore. Skipjack and yellowfin are fished all year from Dakar to Luanda on the west African coast.

The principal fishing methods are: (a) skipjack and yellowfin--pole fishing with live bait; (b) yellowfin and big-eyed--long-line fishing with dead bait; (c) yellowfin and skipjack--purse seine.

Types of vessels: (a) 15 Korean long-liners (75 gross tons); (b) 3 Korean long-liners (340 tons); (c) 6 Japanese pole-fishing boats (125 tons); (d) 25 French pole-fishing boats (60 tons); (e) 2 Spanish purse-seiners (80 tons); (f) about 30 long-liners of different nationalities (75 tons).

There is one cold-storage plant which is located near the Free Port. It has a capacity of 1,800 metric tons. There are no plans for expansion. No research is at present being done on tuna in Liberia. (United States Embassy, Monrovia, Feb. 17, 1966.)

Malagasy Republic

JOINT FISHING VENTURE IN MALAGASY REPUBLIC TO EXPAND:

A major Japanese fishing company has decided to expand operations of a joint shrimp-fishing venture with the Malagasy Republic. Terms having been agreed upon with the Malagasy investors, the Japanese company has applied for a license for the investment from the Japanese government agencies concerned.

Originally capitalized at 27 million yen (US$75,000), the capital of the joint venture is to be increased to 130 million yen ($361,000) by additional participation of the Japanese stockholders and a French-affiliated cold-storage company. The investment ratio will be 51 percent for the Malagasy side and 49 percent for the Japanese side. The management will be composed of 4 persons of the Malagasy side and 3 of the Japanese side, the presidency being filled by the Minister of Agriculture of the Malagasy Republic. The Japanese will be in charge of actual fishing operations, processing, and sales.

The joint venture was established in October 1963 to fish for shrimp in the Straits of Mozambique, off the west coast of Malagasy. The annual catch of shrimp by the expanded concern is projected at about 900 metric tons, valued at 300 million yen

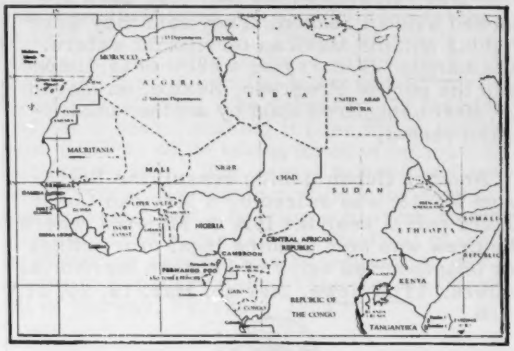
Malagasy Republic (Contd.):

($833,000), to be exported to Japan and the United States. (Nihon Keizai, Feb. 23, 1966.)

Mauritania

NEW COLD-STORAGE AND PROCESSING PLANT:

A new, large, fish-freezing and processing plant began pilot operations in January 1966 in Port Etienne, Mauritania. The plant represents an investment of about US$3 million believed to be entirely private French capital. It is reported to be the largest and most modern fish-freezing and processing plant in western Africa and perhaps in all of Africa, with the possible exception of an operation in Cape Town, South Africa. The plant has a storage capacity of 5,000 tons at -18° C. (0° F.), a freezing capacity of 100 tons a day at -40° C. (-40° F.), and an ice-making capacity of 60 tons a day. The plant operators intend to contract for the purchase of fish from French, Spanish, and Japanese trawlers fishing the reportedly lucrative grounds off the coast of Mauritania.



Processing operations will include: filleting; heading, gutting, and similar operations appropriate to the species; and packaging. The products are to be exported primarily to the European market. It is possible that some products, such as fish blocks, will be suitable for the United States market. (United States Embassy, Nouakchott, Jan. 4, 1966.)

Mexico

FOREIGN FISHING ACTIVITIES OFF MEXICO'S COASTS:

The appearance of large Soviet fishing vessels in the Gulf of California, renewed Soviet fishing in the Gulf of Mexico, and increased fishing by the Japanese is causing concern among Mexican fishermen. The Foreign Ministry explained to reporters that the Soviets are free to fish in the Gulf of California for although the Gulf juts some 700 miles up into Mexico, its waters (save those along the coasts) are international.

In mid-March 1966, the Mexican Ministry of the Navy ordered the Mexican Coast Guard to increase vigilance in coastal waters and particularly along the Yucatan Peninsula. The orders stem from recent poaching incidents and armed encounters in Mexican waters.

On March 17, the Cuban fishing vessel Lambda 17 was reportedly attacked and sunk by an unidentified vessel. The twenty crewmen of the Lambda 17, who were picked up

Mexico (Contd.):

by other Cuban vessels operating in the area, told Mexican authorities that they were attacked without reason. They said they were fishing outside Mexican territorial waters. The Lambda 29, carrying a crew of 13, limped into the port of Progreso, Mexico, on March 16, after being fired upon by another unidentified vessel.

Another Cuban fishing vessel, the Escribano Ro-13, was seized by a Mexican Coast Guard patrol near the Isla de Mujeres, where the crew was held pending legal proceedings for unauthorized entry of Mexican territorial waters. (The News, Mexico, Mar. 19, 20, 21, 1966.)

Morocco

SARDINE FLEET DAMAGED BY STORM:

A severe storm accompanied by high winds and waves struck the Atlantic coast of Morocco the night of February 20-21, 1966. Ports from Tangier south to Agadir suffered damages but the fishing port of Safi was hardest hit. A total of 42, or over a third of the 30- to 60-ton-class sardine vessels in the port, were sunk and 22 were seriously damaged. Another 9 smaller motorized fishing boats were sunk. The only vessels which escaped damage were those in drydock. The disaster is particularly felt since the boat owners customarily own only 1 or 2 vessels at most and many are owned on a share basis. Many of the vessels were uninsured following local practice of insuring them only during the actual fishing season from approximately May to December.

The Government moved quickly to assure the thousands of families depending on fishing and the fish-canning industry that every effort would be made to restore the fleet as much as possible by the opening of the season. (United States Embassy, Rabat, March 7, 1966.)

Nigeria

JAPANESE SURVEY NIGERIAN FISHING INDUSTRY:

A nine-man Japanese Survey Mission arrived in Lagos on February 15 to begin a five-week survey aimed at establishing a fishing port in Nigeria. The team consisted of 4 engineers, 4 economists, and 1 fishing expert. The survey was provided by the Japanese Government under its technical assistance program.

Nigeria relies heavily on imported supplies for meeting its demand for fish. The Food and Agriculture Organization (FAO) has estimated that 75-80 percent of Nigeria's annual consumption of fish comes from imports at a cost in foreign exchange of about US$23.8 million. Norway alone supplied $8.9 million worth of stockfish to Nigeria in 1965. Development of an efficient local industry, therefore, could effect considerable savings in foreign exchange while providing more employment in Nigeria. (United States Embassy, Lagos, Feb. 26, 1966.)

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LAKE CHAD FISHERY DEVELOPMENTS:

In late 1965 the Federal Fisheries Service of Nigeria established a research station at Lake Chad, consisting of a laboratory, workshop, and office quarters for three fresh-water biologists.

The major objectives will be to determine fish stocks, potential, rate of fishing the waters can stand, and conservation measures necessary in order to maintain maximum production.

Nigeria (Contd.):

The experimental work will get under way sometime in September 1966 when two research launches (42 footers) are expected to arrive at Malamfatori on Lake Chad.

In 1965, the World Bank signed an agreement with the Government of Nigeria for extensive road construction in the Northern Region, including a road from Maiduguri to Malamfatori. Construction on this road has begun and it is expected to be completed within about two years. The completion of this road is essential for future distribution in the North and elsewhere in Nigeria for fish caught in Lake Chad.

The annual yield in Lake Chad is estimated at 40,000 metric tons. However, the Federal Fisheries Service, Lagos, feels certain that a systematic testing of the lake's resources with the two launches may confirm the possibility that Lake Chad's annual fish yield in future years may reach as high as 100,000 tons. It is likely that the research station may, by late 1967, have determined whether an annual yield of this magnitude is possible. If so, it should make a significant economic contribution to Nigeria as well as to Chad, Cameroun, and Niger. (United States Embassy, Lagos, March 27, 1966.)

Norway

HERRING FISHERY OPENS WITH HEAVY CATCHES IN EARLY 1966:

The first phase of the 1966 Norwegian winter herring fishery was concluded on February 19, 1966, with a total recorded catch of 2,750,000 hectoliters (255,750 metric tons) with an ex-vessel value of Kr. 80 million (US$11.2 million). More than two-thirds of the catch went to fish meal and oil plants. The 1966 catch was much greater than comparable catches in 1965.

The second phase of the Norwegian winter herring fishery (the period after the herring have started to spawn and quality is consequently lowered) started on February 21. Weather conditions were good and herring were abundant. The total Norwegian winter herring catch could exceed 4.5 million hectoliters (418,500 tons). (United States Embassy, Oslo, February 27, 1966, and other sources.)

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NEW AUTOMATED PURSE SEINERS FOR HERRING FISHERY:

The building of fishing vessels in Norway has been stimulated by good herring catches in 1965 and early 1966. One of Norway's largest shipbuilding firms is said to be building a new type of herring purse seiner costing about US$420,000. The vessel is 125 feet long and has 2 decks, making it possible to maintain stability while taking loads of up to about 465 metric tons. The vessel is equipped with power block, two side propellers for better maneuvering, and a herring pump that sucks fish out of the purse seine. The first of the new herring vessels was scheduled for delivery in February 1966. (The Export Council of Norway, February 1966.)

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CANNED FISH EXPORT TRENDS, JANUARY 1-DECEMBER 25, 1965, WITH COMPARISONS:

In 1965, Norwegian exports of canned brisling were down somewhat from 1964, while exports of small sild and kippered herring were up slightly, according to preliminary data. But in 1965, stocks were down and fishing for small sild was disappointing.

During January 1-December 25, 1965, exports of the principal items in standard cases (100 $\frac{1}{4}$ cans) were as follows (comparable 1964 data in parentheses): brisling 385,000 cases (412,000 cases), small sild 919,000 cases (875,000 cases), and kippered herring 257,000 cases (247,000 cases).

During January 1-October 31, 1965, exports of canned crab were 675 metric tons (665 tons in 1964), and exports of canned shrimp were 375 tons (756 tons in 1964).

The pack of canned brisling during January 1-November 13, 1965, was 389,000 standard cases (about the same as in 1964) and that of small sild was 580,000 standard cases (down 18 percent from 1964).

Stocks of brisling and small sild were short in late 1965. The short 1965 pack of small sild was causing concern. In addition, carryover stocks of canned brisling have gradually been reduced over the last several years by an upward trend in sales.

The United States was the principal market for Norwegian canned fish exports in the first 10 months of 1965 taking 9,190 tons valued at Kr. 52 million (US$7.3 million), a gain

Norway (Contd.):

of 10 percent in quantity and 15 percent in value over the same period of 1964. Other important markets for Norwegian canned fish are Great Britain, continental European countries, South Africa, Canada, and Australia. (Norwegian Canners Export Journal, December 1965 and January 1966.)

Panama

FISHERY DEVELOPMENTS, 1965:

Shrimp Fishery: Unofficial figures show that shrimp exports in Panama for the first nine months of 1965 of about 8 million pounds were below the 9.6 million pounds exported in the same period of 1964. The value of the shrimp catch in 1965 for the first nine months was US$5.7 million as compared to almost $5.3 million in the same period of 1964. A higher percentage of premium-grade shrimp was caught and higher prices were obtained in the U. S. market, accounting for the increase in the value of the catch in 1965. As in the past, the entire shrimp catch was exported to the United States.

Panamanian fishery officials estimated that the total 1965 shrimp catch probably was

Fig. 1 - One of the more modern Panamanian trawlers which has just unloaded a cargo of shrimp at a freezing plant in Panama City.

slightly lower than the average of 12-13 million pounds landed in the last three years and considerably below the 15.5 million pounds taken in 1964. Nonetheless, higher market prices and the high percentage of premium-grade shrimp caught during the year should bring the dollar value of the catch to over $7

Fig. 2 - Three shrimp plants (one off picture to the left) are concentrated in this area of Panama City.

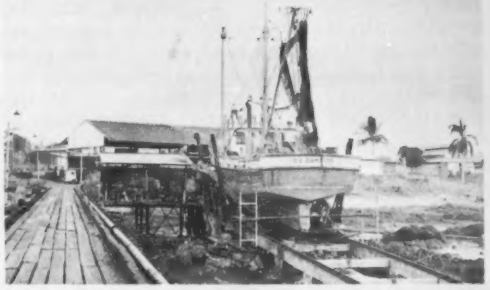

Fig. 3 - This shrimp firm in Panama City has its own fleet, and marine ways for repair of both its own fleet and independent vessels that fish for the plant.

million, although officials of at least one large local shrimp concern believe this estimate may be high in view of reportedly extremely poor fishing conditions in November and December 1965. Government officials predicted that Panama's annual shrimp catch will level out at about 12-13 million pounds per year, pending the development of equipment capable of fishing below 50 fathoms. Practically all shrimp waters inside the 50-fathom line on Panama's Pacific coast currently are being fished. Little is known of the shrimp population out beyond 50 fathoms. Premium-grade white shrimp generally are caught at about the 12-fathom line, while the valuable pinks are fished between 30-45 fathoms. "Titi" and "carabali" usually are caught in shallower waters around river mouths. Estimates of the above types during the next several years will be: whites 4.3 million pounds; pinks 2.5-3.0 million pounds; "titis" 5.0 million pounds and "carabali" 0.6-0.8 million pounds.

Panama (Contd.):

Fig. 4 - Shrimp trawlers docked at the village of Pedregal near David in Chiriqui Province.

Fig. 5 - A basket of shrimp, mostly white, moves on a conveyer belt into the plant at the village of Pedregal. Shrimp are kept on board the vessels in chilled brine which sometimes forms ice.

Concern continues to exist regarding the possible necessity for the establishment of shrimp conservation measures in local waters. While opinion varies, the industry generally believes recent government actions limiting the number of boats authorized to fish for shrimp on the Pacific Coast to 254 will safeguard the current shrimp population. During 1965, it is estimated that between 205-210 vessels actually were operating during most of the year. It is unlikely that the full number authorized actually will fish at any one time because of the necessity for repairs,

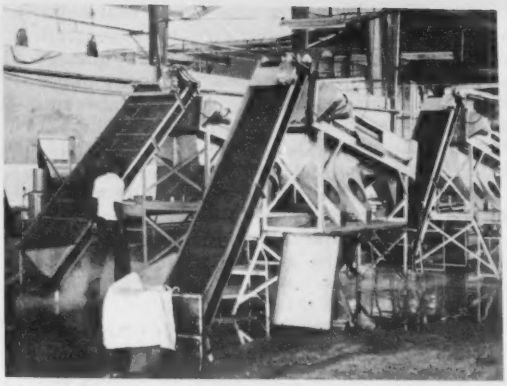

Fig. 6 - Two sorters used to separate the shrimp by size--one for large and the other for "titi"--in a shrimp plant in the Paitilla district of Panama City.

Fig 7 - Removing frozen shrimp from freezers in a Panamanian shrimp plant.

sales of vessels to foreign enterprises, and the failure of some companies to construct vessels authorized for construction.

Fishing conditions were only fair during 1965 and industry spokesmen claim catches during November and December were abnormally low even considering that those months usually are a "slack" period. The same sources report that unusual northerly winds during early 1966 prevented cold water from moving inshore and that shrimp catches consequently remained poor through the first six weeks of the year. Apparently in normal years upwellings of cold water bring increased food for shrimp and improve the quality and quantity of the catch.

Panama (Contd.):

Buoyed up by a record 1964 year, the financial condition of the local industry generally is good with a number of companies making substantial inroads into backlogs of indebtedness built up earlier in the decade. Individual fishermen and boat operators continue to be plagued by high operating costs and spotty fishing conditions, but despite this, money has been found to modernize many of the vessels, and the general status of the fleet is good.

Fish Meal and Oil Industry: A prophesied increase in the production of fish meal and fish oil at the country's single operating fish-reduction plant was realized. Production of fish meal was 6,250 short tons and fish oil production was 1,554 short tons, more than double the production for 1964. Fishing for anchovy and thread herring during 1965 and early in 1966 was excellent (but catch figures were not available); this was undoubtedly a major factor in the increased fish meal and oil production.

Fig. 8 - Panamanian fish meal plant.

An official of the only fish meal company indicated that the firm's fish meal was sold to the United States (2,100 tons), West Germany (1,754 tons), and Central America (925 tons). About 1,500 tons were sold locally. All fish oil exported by the company was sold to West Germany (1,240 tons), with 258 tons consumed locally.

Contrary to earlier expectations, a fish meal plant under construction by Panamanian-Peruvian interests on Taboguilla Island several miles off the Pacific coast near Panama City failed to begin operations during 1965. It was expected that the $2 million plant would be completed and in operation by mid-1966. Three of 10 standard anchovy fishing vessels ordered by the firm from a Peruvian shipyard were in Panamanian waters. Trial runs of at least one of the vessels indicated some difficulty in adapting the large purse seiners to Panama's shallow waters. However, the management of the local firm was confident necessary adjustments could be made and fishing techniques developed to permit optimum use of the boats by the time the Taboguilla plant would be ready to begin operations. The plant will have a capacity of 35-50 tons of fresh fish per hour. Most of the equipment of modern design is already in Panama. A shipyard also will be constructed on the island to repair the company's fleet and to build additional fishing vessels.

Fig. 9 - Bagged fish meal is stored in this well-ventilated building prior to shipment.

No figures were available regarding the dollar value of the fish meal and oil production for 1965. However, assuming average prices of $150 per ton for fish meal and $180 per ton for fish oil, local production may have had a value of over $900,000 for fish meal and $275,000 for fish oil during the year. Panamanian fish meal, because of its high protein content, is sold at premium prices in world markets. Panama's Bureau of Fisheries estimates that 1966 production of fish meal and fish oil may have a value in excess of $2 million, provided that the Taboguilla plant begins operations by mid-year.

Dr. William Baylif, an employee of the Inter-American Tropical Tuna Commission, prepared an excellent study concerning the anchovy population in waters adjacent to Panama City. Field work was conducted during 1963-1964 and the results were subsequently published by the University of Washington at Seattle as a doctoral dissertation. Among Dr. Baylif's observations was the comment that almost twice the number of anchovy are found in shallow waters east of Panama City compared to areas west of the same city.

Other Developments: Imports of canned fish products (mostly sardines) and dried fish (mostly cod) for domestic consumption during the year remained high and may have exceed-

Panama (Contd.):

ed $2 million in value. Requirements for fresh fish were met by independent fishermen, several small cooperatives, and from fish caught in conjunction with shrimp fishing.

During the year, a Spanish firm conducted a survey of both Pacific and Atlantic coast waters to determine the availability of bottom fish for a canning or frozen fish-packing operation in Panama. It is understood that the results of the survey were not encouraging and that the firm decided against investing in the industry in Panama at this time. The company's vessel, equipped for both echo-sounding and trawling to a depth of 300 fathoms, spent 18 days in Atlantic coast waters and approximately 30 days surveying Pacific coast waters. Apparently no significant potential fishing areas were found on the Atlantic coast. Few areas suitable for trawling were found, due to the high incidence of both rock and coral along the entire Atlantic coast. Results of the Pacific survey by the vessel were not known, but the lack of immediate interest on the part of the company in engaging in fishing operations caused speculation that the results of this survey also were not promising. It is understood that U. S. interests were investigating possibilities for financing a plant to process sardines locally.

A detailed survey of Central American fisheries, including Panama, was approved for financing by the United Nations Special Fund on January 15, 1966. The United Nations Food and Agricultural Organization was to conduct the survey beginning in April 1966, if participating countries make agreed monetary contributions on schedule. A program to provide for the teaching of oceanography at the National University was under study by UNESCO. The abundance of sharks in Panamanian waters could lead to the eventual establishment of a small local shark-fishing industry.

A Decree Law, dated October 14, 1965, prohibiting "fishing for all species of seafood within the territorial waters 12 miles from the coast (in certain specified areas) by fishing boats of ten gross tons or over," was one of two significant pieces of fishery legislation approved during 1965. The above decree law, designed to protect small fishermen and cooperatives, primarily in the El Farrallón area about 70 miles west of Panama City, alleges that in certain areas high-powered fishing vessels with modern equipment made inroads into the catch, and consequently into the incomes, of small fishermen. The law was subject to some criticism on the part of local shrimp companies. The law represented no change in Panama's traditional view that national jurisdiction extends 12 miles into territorial seas for fishing purposes.

A second Decree Law, dated March 12, 1965, was passed ostensibly to induce additional investment in Panamanian fisheries. However, according to some industry spokesmen, provisions of the law restricting the importation of vessels and equipment for use by local companies actually curtailed investment in the local industry. Representations were being made by local shrimp companies to the Ministry of Agriculture, Commerce and Industries for a revision of the law to terms more favorable to their interests. (U. S. Embassy, Panama, March 2, 1966.)

Peru

FISH MEAL PRODUCTION AND ANCHOVY CATCH, JANUARY-FEBRUARY 1966:

Peruvian fish-meal production in January 1966 set an alltime official record of 242,380 metric tons; however, the estimated production for February dropped to 174,905 metric tons.

Based on production figures, it was estimated that anchovy landings for January 1966 were 1.6 million tons and for February were 1.2 million tons. So far this fishing season (October 1, 1965-June 30, 1966), anchovy landings have been estimated at 5 million tons. As the Government of Peru has limited this season's catch to 7 million tons, 2 million tons remain to be caught.

Fish oil production was down as the percentage of "peladilla" (immature fish) was high, reducing the oil recovery as well as producing less fish meal per ton of fish. (United States Embassy, Lima, March 13, 1966.)

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REDUCTION PLANTS BUY NORWEGIAN EQUIPMENT TO PROCESS FISH SOLUBLES:

Some Peruvian fish-reduction plants have ordered supplementary processing equipment

Peru (Contd.):

from a Norwegian firm. The additional equipment consists of steam dryers and other installations making it possible to process fish solubles, a byproduct of fish reduction to meal. At present, only a few Peruvian plants have such equipment. (The Export Council of Norway, February 1966.)

Editor's Note: Apparently cost pressures within the Peruvian industry are leading some processors to maximize efficiency.

Philippine Republic

FISHING INDUSTRY DEVELOPMENTS, 1965:

Summary: The Philippine fishing industry continued throughout 1965 to struggle with many of the same problems which have plagued the industry for a number of years. Although there was an increase in production by marine and inland fishermen, production was still well short of consumption, necessitating a sizable import of canned fish products. Total imports for 1964, the latest year for compiled statistics from the Philippine Fisheries Commission, were 49,400 metric tons, valued at US$14.4 million. This is a sizable cost in the use of scarce foreign exchange which could be avoided if the industry were able to fulfill the country's needs. This could be done, but the industry is plagued by lack of proper refrigeration, canning, icing, and transportation facilities. Despite these problems, however, the marine fishing industry increased production in 1964 by 24 percent to 258,000 metric tons. This was done with only a slight increase in gross registered tonnage of fishing vessels. The previous administration promised aid to the industry but the promises were never fulfilled. Whether the new administration will do otherwise has as yet not been spelled out. One dramatic change occurred in 1964 however, when South Africa's share of the import market dropped from 47.3 percent in 1963 to 10.3 percent in 1964, due to South Africa's apartheid policies.

Production and Consumption: The Philippines in 1964 produced 603,500 metric tons of fishery products, including shell buttons, reptile skins, shells and sponges, valued at US$201.3 million. This was 10.3 percent more in quantity over 1963 when 547,300 tons were produced.

Fig. 1 - Republic of the Philippines.

The Commission of Fisheries divides its statistics on fish production into three categories: Commercial fishing, fish ponds, and municipal fisheries and sustenance fishing. Production, as in previous years, remains short of consumption which was estimated at 643,300 tons, or about 4.6 pounds per capita annually. A figure of 67.3 pounds per capita annually was established in 1964 by the National Research Council of the National Science Development Board as the minimum healthful requirement. Since this would require the availability of 954,200 tons, actual production in 1964 was 36.7 percent short of the requirement.

Imports and Exports: The exports of fish products, as reported in previous years, continues to be insignificant. In 1964, the Philippines exported only 964 tons of fish products valued at about $615,300. This was a slight increase over 1963 in both quantity and value. The bulk of the exports consists of shell buttons, wet-salted fish, capis shells, and whole shells. A fledgling shrimp exporting business, which got under way in 1963,

Philippine Republic (Contd.):

Fig. 2 - Philippine purse-seine vessel, scouting waters off Palauan Island in Sulu Sea searching for schools of mackerel with echo-sounder, approaches mothership.

showed a drop in exports during 1964 when only 52 tons were exported valued at about $57,000. The bulk of exports of all Philippine fishery products went to the United States (including Hawaii), Guam, and Japan.

In 1964, the Philippines imported 49,400 tons of fish products, roughly the same as 1963, when 49,800 tons were imported. The imports for 1964 were valued at $14.4 million and consisted mostly of canned sardines and mackerel.

Since one of the basic staples of the Philippines is canned sardines from South Africa, the government's importing and marketing outlet, the National Marketing Corporation (NAMARCO), as well as private local importers were under considerable fire from critics during 1963 and early 1964 for importing sardines from South Africa. The country belongs to the anti-apartheid block in the United Nations and such imports were considered by many as antithetical to the bloc's call for economic sanctions against South Africa. This criticism apparently had considerable effect because in 1964 imports from South Africa dropped dramatically. Whereas in 1963, South Africa held 47.3 percent of the market with imports of 23,500 tons of fish products (mostly sardines), in 1964 South Africa accounted for only 10.3 percent of the market in quantity and 13.7 percent in value. Imports from South Africa were 5,100 tons valued at about $1.9 million. This dramatic drop was partially covered by slightly increased imports from Japan, the United States, Canada, West Germany, and South Korea, as well as a swing away by consumers

Fig. 3 - Mackerel are lifted by scoop net from purse-seine net and dropped on vessel's deck.

from canned sardines to other canned fish. Japan improved its share of the market by a considerable margin. In 1963, Japan supplied only 33.8 percent of total imports; in 1964, her share jumped to 68.2 percent in quantity and 72.4 percent in value. The totals for 1964 were 33,700 tons valued at about $10.4 million. The U. S. share of the market continued to drop from 5 percent in 1963 to 3.4 percent in 1964.

Inland Fisheries: Municipal fisheries and sustenance fishing shared almost equally with commercial fishing in the total production of 1964. Municipal fisheries produced 282,700 tons valued at about $74.7 million, only slight increases over 1963. Production in another category of inland fishing, fish ponds, was 62,700 tons, virtually the same as the previous year.

Marine Fisheries: Although the marine fishing industry is plagued by lack of refrigeration facilities, transport, and marketing problems, it nevertheless managed to increase its annual production during 1964 by nearly 24 percent to a total of 258,000 tons. This increase was accomplished with only a slight increase in gross registered tonnage from 52,653 tons in 1963 to 55,499 tons in 1964.

Processing and Marketing: The commercial fishing industry, as in previous years, continues to be plagued by many problems: lack of adequate berthing and harbor facilities, lack of canneries, poor to nonexistent refrigeration and transportation facilities, and nonavailability of investment capital and bank financing. The only canning facility, White Rose Packing Corporation, was established in 1964 but is not yet in operation. The Minda-

Philippine Republic (Contd.):

nao Development Authority is building two ice plants, one in Palawan and one in Zamboanga City, but neither are yet in operation.

Fig. 4 - Philippine fishermen from the port of Mariveles take in a nylon trammel fishing net which had been set the night before.

Government Activity: The previous administration pledged to help the industry through various means but virtually nothing was done. While the new President has not spelled out specifics with regard to the fishing industry, he has pledged his administration to a program of economic development which will provide basic food staples to the people. Since fish constitutes one of these staples, attention to the ills of the fishing industry could help provide the needed production to eliminate the costly use of foreign exchange for imports.

Fig. 5 - Type of fish trap used in river estuaries of the Philippines.

It is too early to tell what Government attention will be given to the industry by the new administration. It is probable that some Government help will be extended. The Philippines will probably continue to import a sizable amount of its food needs for some years to come, but it would appear that most of this supply will now come from Japan with a small share distributed among the United States, Canada, South Korea, and West Germany. (United States Embassy, Manila, March 8, 1966.)

Poland

FISHERY TRENDS AND DEVELOPMENTS:

Planned Catch: Poland has ambitious plans for the development of her high-seas fisheries. Marine landings in 1970 will amount to 470,000 metric tons, according to the Polish Central Fisheries Board. This is 20,000 tons more than previously planned, and more than double the 1964 catch of 244,000 metric tons. In 1966, the Poles plan to catch 310,000 tons, about 10 percent more than in 1965 when their landings were estimated at 280,000 tons.

Fishing Areas: In 1965, Polish vessels operated in the following principal distant fishing grounds: the Norwegian Sea, the North Sea, the English Channel and the Banks south and west of Ireland; in the North Atlantic: the Icelandic Banks, the Labrador Sea, the Newfoundland and Nova Scotia Banks, the Georges Bank, and areas along the west African coast (especially off Senegal, in the Gulf of Guinea, and in Walvis Bay). The Baltic is also exploited by Polish fishing vessels--about one-fourth of all marine landings is taken there.

Fishing Fleet: Increased Polish landings will result partly from increased labor productivity, but principally from new additions to the fishing fleet. In 1960, the Polish fishing fleet consisted of 87,600 gross tons; by 1970 the Poles plan to add another 200,000 gross tons of new vessels. From 1960 to 1970, the gross tonnage of the Polish fishing fleet will increase by 228 percent, while the increase in fishery landings will amount to

Poland (Contd.):

only 179 percent. However, the Poles plan to decrease this differential rapidly. During 1960-1965, tonnage increased by 112 percent and landings only by 84 percent (see table 1).

Table 1 - Polish Fishing Fleet and Marine Fishery Landings, 1960, 1966, and 1970

	1960	1966	1970
Fishing Fleet (gross tons)	87,600	185,000	287,000
Percentage increase over previous year (%)	-	112	55
Landings (metric tons)	168,300	310,000	470,000
Percentage increase over previous year (%)	-	84	52

Source: Zjednoczenie Gospodarki Rybnej, Warsaw, 1966.

In the 1966-1970 period, both increases will be more harmonious with fleet tonnage increasing by 55 percent and landings by 52 percent. This indicates better cost analysis and more careful planning, as well as greater efficiency in the vessels to be built in 1966-1970. Most will be capable of processing fish immediately and storing the processed catch in refrigerated holds for later delivery. It must not be forgotten, however, that these plans are yet to be confirmed by actual experience.

Fish Processing: Poland has ten major fish-processing plants. Almost all of them manufacture smoked and marinated fish products; more than half of them also can and produce special fish meal.

Wholesale (as well as retail) fishery trade organizations exist in 17 major Polish cities. They are serviced by refrigerated trucks or railroad cars often directly from the fishing vessels.

Exports: Polish fishery exports (amounting to over 11,000 metric tons in 1964 or almost double the 6,500 tons exported in 1960) are directed by the Central Board for Fisheries through the intermediary of "Animex" of Warsaw, an export-import firm. Direct exports of fish from vessels are increasing rapidly. According to Polish statistics, exports of marine fish (which in 1960 were nonexistent) increased to 5,600 metric tons in 1964. Most of the exports (frozen whole, frozen fillets, and salted) are delivered by Polish trawlers fishing nearby to West African countries; some frozen cod blocks are transshipped to the United States and Canadian markets via the French St. Pierre et Miquelon fishing base.

Fishing Enterprises: Poland has eight large state-owned and administered fishing firms (see table 2). Only three of them (Dalmor, Odra and Gryf), however, fish on the high seas with large stern factory trawlers and medium side trawlers. The remaining five firms own only small fishing cutters which do not permit distant operations. All Polish fishing enterprises engage in fish meal production (indicating an increasing demand for this product which has so far been satisfied with increasing imports) and own netting

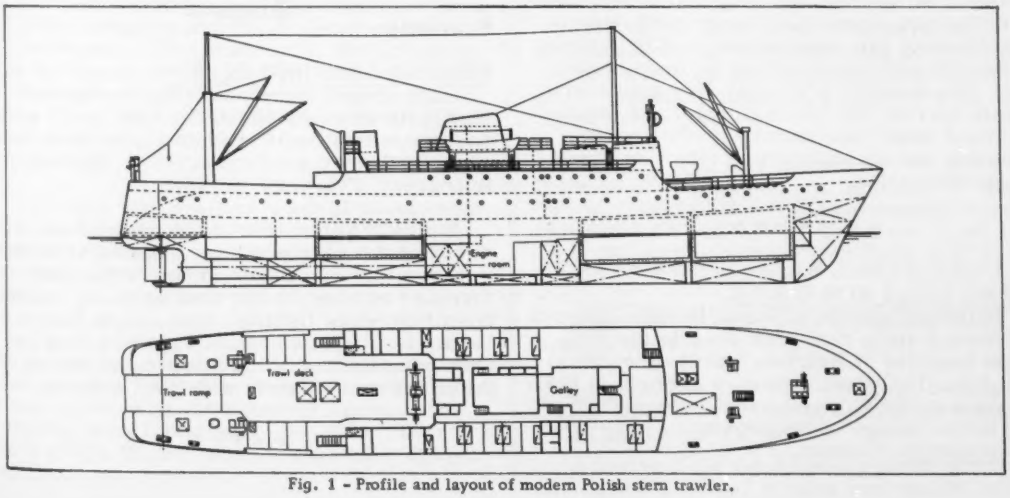

Fig. 1 - Profile and layout of modern Polish stern trawler.

Poland (Contd.):

Table 2 - Polish Fishing Enterprises, 1965

Types of Activity	Fishing Enterprises and Their Locations							
	Dalmor--- Gdynia	Odra--- Swinoujscie	Gryf--- Szczecin	Koga--- Hel	Korab--- Ustka	Kuter--- Darlowo	Barka--- Kolobrzeg	Szkuner--- Wladyslawowo
Deep-sea fishing	X	X	X					
Processing (on ship and shore)		X						
Initial processing only		X	X	X	X	X	X	X
Refrigeration	X						X	
Ice production	X	X						X
Fish meal production	X	X				X		X
Packaging	X	X						
Repair shops	X	X	X		X	X	X	X
"Siloryb" fish meal production	X	X	X	X	X	X	X	X
Netting and gear shop	X	X	X	X	X	X	X	X
Canning		X	X					
Cold storage	X	X			X			

Source: Zjednoczenie Godpodarki Rybnej, Warsaw, 1966.

Fig. 2 - Preparing herring for hot-smoking in a Polish fish canning plant in Gdynia.

and gear shops. All of them process fishery landings in some form, but only one enterprise has full-scale end-processing facilities (Dalmor of Gdynia), and only two enterprises have canning lines. Consumer packaging is done by only two enterprises, and only three have cold-storage facilities or manufacture ice. The fact that all major fish-processing plants (except the one in Gdynia) are located in cities other than fishery landing ports probably has an unfortunate effect on final production costs.

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OCEANOGRAPHIC RESEARCH VESSELS BEING BUILT FOR U.S.S.R.:

Polish shipyards at Szczecin will construct 9 oceanographic research vessels for the Main Institute of Hydrometeorology of the U.S.S.R. The construction will begin in 1967; at present Polish naval architects are working on the design of the prototype. (Zycie Gospodarcze, December 5, 1965.)

Editor's Note: The new Soviet class of oceanographic research vessels has these specifications: displacement of 3,550 tons, length exceeding 100 meters (328 feet), a crew of 105 (50 scientists and 55 crew members), sea endurance of 90 days. This class will be equipped with the latest electronic instruments and each vessel will have 23 laboratories as well as auxiliary installations and workshops. The vessels will have reinforced hulls and air-conditioning, enabling them thus to conduct research both in polar as well as in tropical marine regions. The range of studies will include hydrology, biology, chemistry, geography, acoustics, and other sciences.

Rumania

FISHERY LANDINGS IN 1965:

State-owned fishery enterprises landed 44,250 metric tons of fish in 1965 or 37 percent more than in 1964 when 32,404 tons (landed weight) were produced. (U. S. Embassy, Bucharest, February 18, 1966.)

Editor's Note: Until 1964, more than two-thirds of the yearly catch consisted of freshwater species; however, much of the 1965 increase of over 10,000 tons probably comes from high-seas fishing. Rumanians bought 2 large stern trawlers from Japan in 1964 and have been fishing off Africa's coast and in the Northwest Atlantic with good results.

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Rumania (Contd.):

ACCESSION TO TRIPARTITE FISHERIES COOPERATION AGREEMENT:

Rumania will accede to the tripartite agreement on fisheries cooperation concluded in July 1962 between the U.S.S.R., Poland, and East Germany. Bulgaria joined the agreement in 1964. Administered by a Joint Mixed Commission, the agreement stipulates a close collaboration between the signatory powers in marine fishery research, high-seas fishing operations, and fishery technology. The Commission also forecasts fishing stocks in the Northwest Atlantic and coordinates fishery research there.

Ryukyu Islands

FISHERIES STUDIED BY U. S. EXPERT:

A Honolulu-based expert in fisheries research was asked to assist in the development of Okinawan fisheries research activities. He made a short study in Okinawa in February 1966.

Lucian M. Sprague, Deputy Area Director for Hawaii, Bureau of Commercial Fisheries, U. S. Department of the Interior, made a 2-week visit to Naha, Okinawa, at the invitation of the Civil Administration of the Ryukyu Islands.

His mission was to evaluate and recommend improvements in the collection of tuna fishing statistics and the training of fishery technicians. The technicians, employed by the Ryukyuan municipalities, are responsible for introducing and demonstrating new and improved fishery techniques, collecting fishery statistics, and disseminating information to the local fishermen.

Sprague was drafting a set of recommendations as to how the collection of certain fishery statistics, which are the basis for scientific study of fisheries, can be modernized.

Fishing is big business in the Ryukyus. In addition to supplying the large local fresh-fish market, Okinawan vessels operate as far away as the Atlantic shore of Africa. The thriving tuna fisheries in the Trust Territory of the Pacific Islands also have attracted Okinawan vessels.

Sprague found that despite the apparent prosperity of the Okinawan fleet, it is facing a problem it shares with the Hawaiian fisheries--that of attracting young men to become fishermen. Hawaii's solution has been to establish a State-supported school in Hilo for training young men. In Okinawa, such training is available through a fishery high school.

Senegal

ATLANTIC TUNA FISHERIES:

The principal species of tuna landed in Dakar are the yellowfin, skipjack, and occasionally big-eyed ("Patudo"). Information on the location of principal and minor grounds by species is not available, but the general rule is that the percentage of skipjack increases moving north toward Dakar.

A breakdown of the location of catches by month during the 1964/65 tuna season follows:

November-December: Most catches are made from 15° N. to the Casamance and approximately 17.5° W. Also there were catches off the coast of Portuguese Guinea between 17° and 18° W.

January: Ice vessels made catches off Portuguese Guinea between 17° and 18° W., and freezing boats off Sierra Leone from 14.5° to 15.5° W.

February: Several catches were made around Dakar, between latitudes of 13.5° and 14° and south as far as the southern border of Portuguese Guinea. All catches were between 17° and 18° W.

March-April: Ice vessel catches were from 10.5° to 12.5° N. and between 17° and 18° W. Grounds for freezing vessels were between 7.5° and 9.5° N. and from 14.5° to 16.5° W. with concentrations from 8.5° to 9° N. and 15.5° to 16° W.

May: There were only a few scattered catches in May.

June: A few catches took place between Dakar and St. Louis and a few off the coast of Sierra Leone 15° W.

A few vessels were fishing north of Dakar during the summer months and results were

Senegal (Contd.):

encouraging. This year there seems to be increased fishing in the area of the Cape Verde Islands.

With the exception of 1 or 2 purse seiners that on occasion land at Dakar, all of the tuna vessels use live bait and poles.

In January 1966 there were 32 small ice vessels landing their fish in Dakar although more are expected later in the season. SOSAP (Societe Senegalaise d'Armement et de Peche), the Senegalese Government-owned tuna fishing company, is operating 3 of the 5 freezing vessels of 26 meters (85 feet) built with a French loan. The last 2 were expected shortly. The British Government has recently requested tenders on the 4 tuna vessels they will sell to SOSAP on a long-term loan. (As part of a Soviet-financed tuna complex, there is provision for 15 ice vessels. An agreement of principle was signed with the Soviets in March 1965, but the technical problems have not been resolved and discussions are taking place.)

At one time there had been 7 canneries in Senegal. But, now there are 3 French-owned canneries in operation: 2 in Dakar and 1 in Rufisque, and they have been discussing possibilities of further consolidation. Their total capacity is 120 metric tons a day with 15 percent skipjack. A cannery with a yearly capacity of 15,000 to 20,000 tons is planned as part of the Soviet-financed complex mentioned.

The Dakar ORSTOM (Office de la Recherche Scientifique et Technique Outre-Mer) laboratory, in conjunction with ORSTOM installations in Abidjan and Pointe Noire, is studying population dynamics of the Atlantic tuna. For the last few months ORSTOM has been obtaining catch information but the lack of an oceanographic vessel has prevented extensive research. (United States Embassy, Dakar, January 25, 1966.)

South Africa

GOOD 1966 FISHING SEASON FORECAST:

Bright prospects were forecast for the South African fishing industry for 1966 by the chairman of the South African Fishmeal, Fish Canners and Fish Oil Producer Associations.

Fish Meal: Prices reached a very high level during October and November 1965, but with heavy production in Peru during December and January, prices leveled off; however, the market remained firm in March 1966.

The South African industry was not selling as of that date until it could be established more accurately what the production would be. About 60 percent of the estimated production of fish meal for the year has been sold. A good portion of this has been sold on the high market. The fish meal has been sold to the traditional markets in Europe and the United States.

Fish Oil: The entire 1966 production has been sold to the United Kingdom at about the same price as last year.

The first shipment of oil will be made from Walvis Bay about April 1966.

Canned Fish: Sales were to regular markets with the local market in South Africa showing an increase of about 100 percent over the past few years.

A new market for canned goods is Japan which is taking 150,000 cases in the traditional soya pack. "With fish becoming scarce in their traditional fishing grounds I feel that this will become an important market in the future. We hope to develop this market considerably," the chairman said.

Spiny Lobster: The United States market was very stable and the industry was having no difficulty in disposing of its quota. Mount Vema had come to an end, the last boats returning empty.

The chairman said he saw no difficulty in the factories meeting their quotas this year. After a bad start the fishing in the Republic was improving. (Namib Times, Cape Town, March 4, 1966.)

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NEW SPINY LOBSTER PLANT:

A wholly-owned South African company (with French principals and offices in Durban and Cape Town) is behind a move to fish the rich spiny lobster or crayfish grounds in the Indian Ocean off the South African coast, operating from Durban.

Two of the principals behind the enterprise were in Durban to organize the venture follow-

South Africa (Contd.):

ing the arrival of their first vessel from Brittany, the La Barade, in early March 1966.

A second vessel, the Frai-Lann, was due in Durban. One of the men said that additional vessels would be employed if the venture warranted them.

The company holds a quota of 10,000 cartons of spiny lobster for export to Europe. (Namib Times, Cape Town, March 4, 1966.)

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NEW STERN TRAWLER WITH SHELTER DECK:

The Dunblane, the third of a series of 75-ft. stern trawlers to be built for a major South African fishing company, incorporates a number of design changes adopted in the light of experience with the earlier vessels Scotia and Dunscore which have been fishing successfully in waters off the Cape of Good Hope.

Most striking of the innovations, which also reflect an extensive survey of overseas design trends, is the adoption of an extended shelter deck which provides considerably more uncluttered working and storage space and a generous measure of weather protection for the crew.

The net roll is mounted above the after-deck on a higher-than-usual gantry, arranged to align with the transom, and this is designed to simplify the job of hoisting the cod end aboard and over the fish bins.

A multipurpose vessel, designed to trawl for white fish out of Port Nolloth or to fish for spiny or rock lobster at Vema ridge, the Dunblane arrived in Cape Town in December 1965 on her delivery voyage. Although it has no refrigeration, the fish hold is insulated with polyurethene foam and the engineroom provides ample space for the installation of a freezing plant. The hold capacity of 3,000 cubic feet is sufficient for about 25 metric tons of fish, and 7 dinghies (handled by two derricks) are carried.

Four similar vessels are either already in service or under construction. One is fishing for shrimp off the Mozambique coast.

The Dunblane has a gross tonnage fractionally less than 100--which means that she is exempt from the provisions of the South African Merchant Shipping Act which require all craft of this size and over to be manned by a certificated master, first mate, and engineer. Her four-cylinder diesel engine, driving a variable pitch propeller, develops 280 hp. at 340 r.p.m. and gives the vessel a speed of 10 knots. Her fuel tanks have a capacity of 5,810 imperial gallons.

The two derricks are mounted on the shelter deck to handle the dinghies used in lobster fishing. The use of a high-pressure hydraulic system for this work gives high-speed operation so that the dinghies can be hoisted aboard with a minimum of delay if bad weather should blow up without warning.

With accommodations for a total of 24, the Dunblane is compactly designed for maximum space utilization. Her draft of 8 feet will allow her to operate from across the Port Nolloth bar and she has a beam of 21 ft. and a moulded depth of 10 ft. 6 in.

The shelter deck extends from abaft the bridge and brings the trawl winch, which is mounted there, into convenient proximity with the remote engine controls and other fishing gear. Bridge equipment includes a transistorized echo-sounder, a fish-finder with black and white lines, a radiotelephone, and radar.

On trials off Durban the Dunblane displayed remarkable maneuverability by making complete turns, both to starboard and to port, in a circle of only 100-ft. diameter. From full ahead, she was brought to a "crash stop" in 100 ft. Hard a'port to hard a'starboard was achieved in 20 seconds. (The South African Shipping News and Fishing Industry Review, January 1966.)

South-West Africa

BOOM CREATED BY FISHING INDUSTRY:

The port of Walvis Bay in South-West Africa is experiencing a boom due in large part to various fishing industry developments.

Big developments are being planned in the white fish industry. The Walvis Bay Town Council made several sites with sea frontage available for the construction of fish-processing and storing factories and one concern

South-West Africa (Contd.):

is believed to be planning to invest over US$4 million in the white fish industry there.

This is being done against the background of no less than 120 vessels of ten foreign countries trawling off the South-West African coast. Using modern fish-finding and processing equipment and the latest trawlers, the main catch is hake. This is cleaned and frozen and then transshipped to reefer vessels for shipment back to the home country.

Next year will see an even bigger buildup of foreign trawlers off the South-West Africa coast. (South African Shipping News and Fishing Industry Review, January 1966.)

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COMMISSION TO STUDY STATUS OF FISHING INDUSTRY:

A 3-man Commission of Inquiry has been appointed by the South-West Africa Administration to study the fishing industry. The Commission was expected to start work in February 1966 to inquire into, report, and make recommendations on the systematic, intentional, and effective exploitation of and control over the fish potential of South-West Africa, with regard to the current quotas already granted to industrialists.

It was also to examine the desirability of increasing or reducing the quotas and of granting one or more new licenses either in Walvis Bay or elsewhere along the South-West African coast. Its scope includes incidental matters relating to controlled fish, including spiny or rock lobster and white fish.

The 8 fish meal factories in South-West Africa each have a quota of 90,000 metric tons of pilchards. It has been reported that the Government may grant each plant an interim quota increase of 10,000 tons, bringing the total quota to a record 800,000 tons. (South African Shipping News and Fishing Industry Review, January 1966, and Namib Times, February 4, 1966.)

Taiwan

SMALL INCREASE IN 1965 FISHERY LANDINGS:

Catch: The fishery production of Taiwan in 1965 of 381,688 metric tons was 1.4 percent over the 376,398 tons in 1964.

The only increase was in the deep-sea fisheries and was due mainly to the increase in the number of bull trawlers and their comparatively good average catch. Outer coastal fisheries suffered the first setback since 1948. This may be due to abnormal water temperatures, which resulted in scarcity of such important species as the sardines, bonito, and horse mackerel.

Taiwan's Fishery Production, 1964-1965

	1965	1964	Increase or Decrease from 1964
	. (Metric Tons) .		. . . . (%) . . . . .
Deep sea	135,949	126,765	+7.2
Coastal, outer . .	160,924	161,151	-0.1
Coastal, inner . .	30,655	32,191	-4.8
Fish culture . . .	54,160	56,291	-3.8
Total	381,688	376,398	+1.4

More Tuna Long-Liners in Operation: By January 1966, the last of the 16 tuna long-liners constructed with a loan from the World Bank had left Taiwan to fish in the Indian Ocean. Of the ten 120-ton tuna boats constructed with a loan from the Joint Commission on Rural Reconstruction, two were completed in December 1965 and are now fishing off Mauritius Island in the Indian Ocean.

Outstanding Results Obtained in Fish Pond Fertilization: By the application of superphosfate in fresh-water fish ponds in which the silver carp (Hypophthalmichthys molitrix) was the dominant species, the fish culturist of the Joint Commission on Rural Reconstruction was able to increase the production of fish from 2 to 4 times as compared to ponds using organic manure. This was possible because the silver carp is exclusively a phytoplankton feeder and phosfate increases the production of phytoplankton. (T. P. Chen, Joint Commission on Rural Reconstruction, Taipei, Taiwan.)

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SEEKING FURTHER JAPANESE COOPERATION IN FISHERIES:

Both Government and private circles in Taiwan plan to expand pelagic tuna fisheries and to enter the trawler fisheries. They are working on Japanese circles concerned, with the intention to tie-up with Japanese trading firms and fisheries companies in fishing operations and marketing of products.

Taiwan lays special emphasis on tuna in its efforts for the development of the fisheries. It embarked on fishing operations based

Taiwan (Contd.):

at American Samoa in the Pacific in 1964 and has been endeavoring to expand its pelagic tuna-fishing fleet, mainly for the purpose of increasing its tuna exports to the United States. In 1965, it built 13 tuna-fishing vessels of 357 gross tons in Japan with a loan from the World Bank, and extended its fishing activity to the Indian Ocean. It is determined to develop its fisheries further, and the Government of Taiwan has received another loan from the World Bank of about US$10 million, for the development of fisheries. This loan will be used to build 12 tuna-fishing vessels of 250 gross tons and 4 trawlers of 1,500 gross tons. In addition, used tuna-fishing vessels up to a limit of 4,500 gross tons total will be purchased from Japan in the next year.

These plans will increase considerably Taiwan's tuna fisheries in the Pacific and Indian Oceans. The Government of Taiwan has taken the following steps to aid its tuna fisheries: (1) to permit free fishing so that the production costs of private fisheries enterprises will not increase due to exclusive fisheries rights; (2) to exempt fisheries enterprises from income tax for five years after their establishment. Besides, it is said that the wage level in Taiwan is only one-fifth of that in Japan. Taking these factors into consideration, it was estimated that the production cost of tuna fisheries in Taiwan is about 20 percent lower than that in Japan. Taiwan's decision to embark on pelagic trawler fisheries, together with Korea's plan for entry into this field, will endanger Japan's pelagic fisheries because of limited resources.

In the case of Taiwan, obstacles to the building of self-supporting overseas fisheries are the lack of overseas fishing bases (equipped with cold-storage, materials-supply, and marketing facilities) and the weak export structure. Because of these faults, Taiwan must rely on the fisheries enterprises of Japan, which is more advanced as a fisheries nation, for the use of bases and the conduct of marketing. Heretofore, the tuna-fishing vessels of the fisheries enterprises of Taiwan, have been operating in the Pacific and the Indian Oceans in tie-ups with Japanese trading and fisheries firms based in Samoa, Durban, South Africa, and Penang, Malaysia, in such forms as joint use of bases and commission sales.

The Taiwan side is working with these Japanese firms to increase their joint operations. Some Japanese trading and fisheries firms expect that tie-up with the fisheries enterprises of Taiwan, whose production cost is low, will bring considerable benefits, in view of the worldwide shortage of tuna and the rise in the export prices of tuna. They are planning to send their officials to Taipei for negotiations with the Taiwan side. Among the Japanese trading firms, however, there are those which have business connections with Communist China. They fear that cooperation with Taiwan will adversely affect their future relations with Communist China. Also it is feared that cooperation with Taiwan, which will help the growth of Taiwan's fisheries, may eventually drive Japanese fisheries into greater difficulties. So the Japan Federation of Bonito and Tuna Fisheries Co-operative Unions was scheduled to hold a meeting of its Policy Committee to study measures to counter the development of Taiwan's fisheries and to consider the advantages and disadvantages of cooperation with fisheries enterprises of Taiwan. (Nihon Keizai, March 17, 1966.)

Thailand

FISHERIES LEGISLATION FAVORS DOMESTIC FISHERMEN:

Thai legislation on fisheries indicates the Government's desire to reserve the fishing industry, including the ownership and operation of fishing vessels, for the exploitation of its citizens. Most enterprises fishing in Thai waters or delivering their catches to Thai ports will have to be joint-venture enterprises or may have to be operated under a contract with Thai owners of fishing vessels. (United States Embassy, Bangkok, December 15, 1965.)

Trinidad

FOREIGN VESSEL ACTIVITY:

In March 1966, about 18 U. S. shrimp trawlers were operating out of Port-of-Spain, Trinidad, and a local shrimp-processing plant had begun operations. Additional U. S. shrimp trawlers were expected to arrive. Meanwhile, use of Trinidad as a transshipping base by the Japanese tuna fleet had decreased substantially as a result of declining

Trinidad (Contd.):

tuna catches. (United States Embassy, Port-of-Spain, March 8, 1966.)

U.S.S.R.

EXPORTS OF FISHERY PRODUCTS TO WESTERN NATIONS:

In 1964, the free-world imports of edible fish and shellfish preparations from Sino-Soviet Bloc countries amounted to $67.1 million, or about 65 percent more than in 1963 when such imports amounted to $42.0 million (not included are fish meal, fish oils, whale products, and other nonedible fishery products). As in previous years, Communist China was the largest single exporter of edible fishery products to free-world countries ($37.7 million in 1964 and $21.0 million in 1963), followed by the Soviet Union ($23.7 million in 1964 and $16.3 million in 1963). Among other Sino-Soviet Bloc countries, Poland exported in 1964 $3.0 million and North Korea $0.8 million; exports from the remaining countries were negligible.

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PROMOTION OF EXPORTS TO WEST EUROPE:

Soviet Ministries of Fisheries and Foreign Trade will jointly organize a promotional campaign in Western Europe in March and April 1966. A 3,500-gross-ton refrigerated fish transport, the Svetlii, will be placed at the disposition of the organizers and will be equipped with exhibits and samples of Soviet fishery products. Preliminary plans provide for stops in the Netherlands, Belgium, Federal Republic of Germany, United Kingdom, France, Italy, and Greece. This is the first time the Soviets have organized a fishery promotion campaign in Western Europe or elsewhere. Both the European and the Far Eastern Fishery Administrations will participate in the campaign with their specialized products.

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ESTABLISHMENT OF FOREIGN TRADE SECTIONS:

Foreign trade sections are being organized in the five Soviet Regional Fishery Administrations. In 1965, the Western Fisheries Administration organized such a section at Kaliningrad and the result was greatly expanded fishery exports to African countries. Nigeria, which in 1963 and 1964 bought 3,100 and 9,700 metric tons, respectively, of fishery products from the Soviet Union, plans to increase such imports to 36,000 tons in 1966 (data for 1965 not yet available). A Foreign Trade Department was also organized at Vladivostok in 1964 to promote fishery exports to Japan and other nearby Asian countries.

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FISHERY EXPORTS TO THE U. S. DOUBLE IN 1965:

In 1965, exports of Soviet fishery products to the United States amounted to $505,000 (see table) or more than double the value of 1964 exports of $215,000. Despite this increase, U.S.S.R. products represent only a small part of total U. S. imports, which in 1964 exceeded $490 million. Lobsters imported from the U.S.S.R. for the first time in recent years, were the largest item by value ($183,000) and scallops by quantity (647,164 lbs.). Cod blocks ($56,000) and shrimp ($10,000) were also imported by the United States for the first time from the Soviet Union. The remaining Soviet exports (canned king crab, sturgeon roe, canned salmon) are

U. S. Imports of Soviet Fishery Products, 1964-65 1/

Product	1965			1964
	Value	Quantity	Average Price Per Lb.	Value
	US$	Lbs.	USc	US$
Lobsters	183,270	250,520	73.2	-
Scallops	157,279	647,164	24.3	141,467
Cod blocks	55,980	283,500	19.7	-
Crabmeat, canned	52,860	53,762	98.3	35,898
Sturgeon roe	43,575	6,683	65.2	30,279
Shrimp	9,964	33,085	30.1	-
Fish, canned	1,714	2,831	60.5	2,260
Salmon, frsh. or froz.	644	2,258	29.4	-
Other	-	-	-	4,799
Total	505,286	1,279,803	39.5	214,703

1/Preliminary data supplied by the Branch of Statistics, Bureau of Commercial Fisheries, U. S. Department of the Interior.

U.S.S.R. (Contd.):

traditional United States fishery imports from the U.S.S.R.

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PRODUCTION OF CANNED KING CRAB FROM EASTERN BERING SEA:

Soviet king crab catches in the eastern Bering Sea decreased considerably in 1965 after the U. S.-U.S.S.R. agreement on king crab fishing in early 1965. In 1964, the Soviets fished in the eastern Bering Sea from April-July using 3 king crab factoryship fleets consisting of 9 net-setting medium trawlers and 33 pick-up boats. With this fleet of 45 king crab fishing vessels, the Soviets landed 2.8 million male crabs and produced about 72,100 cases (96 8-oz. cans) of canned crab. In 1965, the same number of vessels operating from April to June caught 2.2 million crabs but produced only about 45,000 cases, a decrease of 37.6 percent and an indication that smaller crabs were landed.

Soviet Fishing for King Crab in the Eastern Bering Sea (Bristol Bay), 1959-1965

Year	Months Fished	Number of Vessels: Factoryships	SRT Medium Trawlers 1/	Motor Boats 2/	Total	Tangle Nets Set 3/	Average Time for Set	Male King Crabs	Canned Pack
							Hours	No.	No. of Cases
1965	April-June	3	9	33	45	618,689	132.5	2,225,567	45,010
1964	April-July	3	9	33	45	607,459	136.6	2,799,620	72,104
1963	April-July	3	6	33	42	536,139	162.1	3,019,417	76,369
1962	April-July	2	6	22	30	419,667	110.5	3,019,211	72,160
1961	April-July	2	6	21	29	387,976	128.1	3,441,314	73,154
1960	April-July	1	3	10	14	191,559	94.0	1,995,006	37,722
1959	July-Sept.	1	-	8	9	63,950	95.0	620,406	7,961
Total						2,825,439		17,120,541	384,480

1/Crew of 22, of which 10 are king crab fishermen.
2/Crew of 12, of which 10 are king crab fishermen.
3/In units; length of unit not specified.
Source: Ministry of Fisheries, U.S.S.R.

Editor's Note: In 1965, the Soviets ended crab fishing in the eastern Bering Sea 1 month earlier than in previous years, probably to fish in other parts of the Bering Sea for saury, pollock, and other species. Despite the effort, the Soviet Far Eastern crab fleet failed to meet its yearly production quota in 1965, although it did fulfill its 7-year plan (1959-1965).

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BERING SEA SHRIMP CATCH PLANS, 1966:

The Soviet 1966 catch quota for Bering Sea shrimp was set at 6,000 metric tons (13.2 million pounds). Most of it will be taken off Alaska where about 10 Soviet medium freezer trawlers operated early in 1966 between Shumagin and Kodiak Islands.

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EXPLOITATION OF ALASKA POLLOCK INCREASED:

Soviets sell Alaska pollock to the Japanese on the fishing grounds in the Sea of Okhotsk. Over 100 Soviet seiners and trawlers from the Kamchatka, Sakhalin, and Primorskii Krai Regional Fishery Administrations participated in early February 1966 in that pollock fishery.

In 1964, the U.S.S.R. reported landings of 213,600 metric tons of pollock. In 1966, the Soviets plan to catch over 300,000 tons by late spring when fishing will be discontinued. In addition to direct deliveries (47,500 metric tons in 1966) to a Japanese fish-meal factoryship, Soviets export pollock to other Asian countries.

Most of the Soviet domestic pollock landings are reduced into fish meal, but vitaminized medicinal fish oil is also produced.

In March 1966, the U.S.S.R. sold 5,000 metric tons of frozen whole pollock to a Finnish importer for fur-animal feeding. The price was 4.6 U. S. cents a pound c.i.f. Finnish border; fish were shipped to Finland by rail from Vladivostok.

Note: See Commercial Fisheries Review, March 1966 p. 58.

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MEAT PRODUCTION GOAL LAGS BEHIND THAT OF FISHERY PRODUCTS:

Soviet fisheries production for the 7-Year Plan (1959-1965) has surpassed all expectations while Soviet meat production lags be-

U.S.S.R. (Contd.):

U.S.S.R.'s Planned and Actual Landings of Fish, Shellfish, and Marine Mammals, 1950 and 1959-1965

Year	Planned Production		Actual Production	
	Quantity	Increase Over Previous Calendar Year	Quantity	Increase or Decrease Over Previous Calendar Year
	Metric Tons	%	Metric Tons	%
1965	5,600	14.3	5,650	+10.0
1964	4,900	16.1	5,121	+ 9.6
1963	4,220	7.2	4,670	+12.1
1962	3,937	6.4	4,167	+11.9
1961	3,700	9.5	3,724	+ 5.2
1960	3,380	1/	3,541	+15.2
1959	1/	1/	3,075	+ 4.7
1950	1/	1/	1,755	-10.1

1/Not available.

hind original goals. In 1959, the U.S.S.R. goal for 1965 was a catch of 4.6 million metric tons (live weight) of fish, shellfish, marine mammals, and other aquatic products; the actual production in 1965 was 5.6 million tons, or 22 percent more than expected. In 1959, the Plan's goal was 16 million metric tons of meat output (slaughter weight) by 1965; the actual production of meat in 1965 was only 9.6 million tons, or 40 percent less than expected. This points up the reliance the Soviets are putting on food from the sea to provide the country's protein needs.

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FISHING OFF GREENLAND TO EXPAND:

Soviets plan to expand fishing off west and east Greenland in 1966. Analysis of Soviet explorations show large concentrations of fish in that area. Most of the exploratory fishing was conducted by PINRO (Polar Institute of Marine Fisheries and Oceanography) scientists from Murmansk. It is believed that a majority of fishing vessels operating in the new fishing area will come from the Northern Fisheries Administration, Murmansk.

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PURSE SEINE FOR HERRING IN NORTH ATLANTIC:

The Soviet large stern trawler Aist, using a special hydro-locator, has been fishing North Atlantic herring with a purse seine 650 meters (2,132 feet) long and 130 meters (426 feet) deep. In three months (latter part of 1965 and early 1966), the Aist set the seine 41 times and landed 550 metric tons of herring, or an average of about 13 tons per haul. To speed up the setting and hauling of the net, lead weights and detachable bronze rings were added to it. The Soviets estimate that the adoption of purse seines in their herring fishery might save them 60 percent in gear costs and at the same time increase landings. (World Fishing, February 1966.)

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HAKE FISHING IN EASTERN PACIFIC:

The Soviets have begun hake fishing in the Eastern Pacific with an undetermined number of vessels. Large concentrations of Pacific hake were discovered by Soviet exploratory vessels in the eastern part of the Pacific; the date of discovery was not specified, but was probably in early 1966. Meanwhile, several Soviet vessels reportedly fished hake in the "Eastern Pacific" in February 1966. Official Soviet catch plans for 1966 provide for at least 30,000 metric tons (65 million pounds) of hake.

The Soviet Union had in the first quarter of 1966, three major research expeditions in the Pacific, each consisting of 5-6 research vessels. Two of the research fleets are operating in the eastern Pacific; one near the Gulf of California (off Mexico), the other in an undetermined location off South America. The third one was conducting research off Australia's southern coast and in the Indian Ocean.

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RESEARCH IN THE INDIAN OCEAN:

The Soviet fishery research vessel Akademik Knipovich called at the port of Rangoon, Burma, in February 1966. The ship is on a research cruise in the Indian Ocean. A party of 30 scientists headed by Prof. A. S. Bogdanov, the Director of the Federal Scientific Research Instiutute for Fisheries and Oceanography (VNIRO), is conducting fishery and oceanographic research in the area. At Rangoon, four Burmese scientists joined the Soviet scientific party for a 10-day joint study of fishery resources in waters off Burma's coast.

Editor's Note: The visit of the Soviet research vessel coincided with the opening of the U.S.S.R. Trade and Industrial Exhibition, which opened in Rangoon in March 1966 and which represents a combined propaganda and trade promotion effort by the U.S.S.R.

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U.S.S.R. (Contd.):

CULTURES SHRIMP SUCCESSFULLY:

The Soviet Institute of Marine Fisheries and Oceanography (VNIRO) is cultivating shrimp in the water reservoirs of peat-fired power stations. Previous attempts to breed fresh-water Far Eastern shrimp in reservoirs failed. The problem was solved when shrimp were accidentally introduced into the reservoir of a power station together with fish fry. The even temperature of 35° C. (95° F.), and the soft-peat water provided an excellent medium in which shrimp could breed. In a few years, the number of shrimp has reached several hundred thousand in one reservoir alone. (World Fishing, February 1966.)

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SHARK FISHERY:

Soviets fish for sharks in the Sea of Japan, exporting shark fins to Japan and producing fish meal and fish oil from shark meat for domestic markets. The shark fishery is a relatively new enterprise for Soviet fishermen; in 1964 they caught only 100 metric tons of sharks. The shark fishery is organized by the Far Eastern Fishery Administration with headquarters at Vladivostok.

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NEW LAW BANS DOLPHIN HUNTING:

The Soviet Union has a new law that bans commercial hunting of dolphins, which in the U.S.S.R. is practiced mainly in the Black Sea. The Soviet Fisheries Minister in announcing the new conservation measures, stated that they were necessary because of the increasing importance of dolphins for scientific research and proposed that other dolphin-hunting nations institute similar bans. (United States Embassy, Moscow, March 15, 1966.)

Editor's Note: According to FAO statistics, the total reported world harvest of dolphins in 1963 did not exceed 1,000 metric tons. Turkey was the major dolphin-hunting nation that year (400 tons).

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OCEANOGRAPHIC RESEARCH IN THE CARIBBEAN SEA:

In March 1966, the oceanographic research vessel Iu. M. Shokalskii conducted oceanographic and fishery studies in the Caribbean. In 1965, the same vessel, along with Uliana Gromova and Zhemchug, participated in the Soviet studies of the Kuroshio Current, headed by Prof. A. Muromtsev and sponsored by the Intergovernmental Oceanographic Commission.

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PACIFIC FISHING FLEET INCREASING:

In March 1966, the Soviet Far Eastern Fisheries Administration acquired the 35th large stern trawler (named Seroglazka).

Soviet large stern trawler Pechenga (BMRT-364), belonging to the Maiakovskii class of stern trawlers, fishes ocean perch in the North Pacific. Maiakovskii-class stern trawlers have a cruising range of 17,000 miles and can stay at sea 80 days. The vessels are about 3,200 gross tons and operate with a crew of 90-100. These trawlers are good producers: in 1964, one of them (Nikolai Ostrovskii) landed over 15,000 metric tons of fish and established a Soviet record for this type of vessel. As a result, the captain was appointed delegate to the 23rd Congress of the Soviet Communist Party held in Moscow in March-April 1966.

U.S.S.R. (Contd.):

This is remarkable progress when one recalls that in 1959 the U.S.S.R. had only 1 large stern trawler operating in the Pacific Ocean and the Bering Sea. During 1960-1963 a total of over 20 Maiakovskii-class stern trawlers were added; most of the 1964-65 additions belonged to the same class. The rate of yearly additions has increased since 1960 and will continue to do so until at least 1970; by then the Soviet Union plans to add several dozen new BMRT's to its Pacific fishing fleet and increase fishery landings to 3.2 million metric tons.

Editor's Note: In 1965, Soviet fishery landings from the Far East (including Antarctic whale catches) amounted to 1,970,000 metric tons.

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REFRIGERATOR FLEET:

Soviet Far Eastern Fisheries Administration revealed that a total of about 100 refrigerated fish carriers and other fish transports were in service as of January 1, 1966, in the Pacific Ocean and Bering Sea. In January 1959 less than 50 fish transports were available in the Far East. The total number of Soviet fishing carriers at the end of 1964 exceeded 300 units.

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FAR EAST FISHING FLEET RECEIVES NEW VESSELS:

The Soviet fishing fleet in the Far East early in 1966 obtained two large new vessels: one, the refrigerated fish carrier Vologda (6,500 gross tons) was built in Soviet shipyards; the other, the Spassk (18,000 gross tons) was purchased in Japan for a reported US$7.5 million. The Spassk is the first of eight fish factoryships ordered by the Soviets in Japan for a total price of US$60.4 million and the following payment terms: 30 percent down, the balance payable in semiannual installments over 5½ years at an interest of 4 percent per annum.

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NEW REPAIR SHIPYARD AT KLAJPEDA:

The Soviet Government has approved plans for the construction of a large fishing vessel repair shipyard at Klajpeda (Lithuania) on the Baltic. More than 10,000 workers will be employed. Six floating drydocks (the largest with a capacity of 27,000 displacement tons) will make possible the overhaul and repairs of up to 120 large stern factory trawlers, fishing bases, and processing refrigerator vessels per year. Klajpeda was selected because the sea there does not freeze in the winter and because of its proximity to the Atlantic, where most of the vessels from the Western (Baltic) Fisheries Administration will fish. The construction of the repair shipyard reportedly will start in 1967 and should be finished by the end of the 5-Year Plan in 1970.

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FINNISH FISHING BASES ON SOVIET ISLANDS:

An agreement has been reached between the Soviet Union and the Finnish Seaman's Union on the establishment of two bunkering and supply depots for the Finnish fishing fleet on two Soviet Islands in the Baltic Sea. It is believed that two Estonian Islands (Hiiuma and Saaremaa) are the sites of the new bases. (United States Embassy, Helsinki, February 26, 1966.)

United Arab Republic

FISHERY PLANS, 1966-1970:

United Arab Republic (U.A.R.) will enter high-seas fishing, the Deputy Premier told the U.A.R. National Assembly in a speech on February 12, 1966. The second 5-Year Plan (1966-1970) includes, in addition to projects for developing inland fisheries, building new harbors for the marine fishing fleet and forming 10 cooperative fishermen's associations to promote the marketing of fishery products. Also includes the purchase of high-seas fishing vessels from the Soviet Union. A mission of experts was sent to the Soviet Union to effect the purchases. The type of vessels to be purchased was not announced; it is likely they will be large stern trawlers which the U.S.S.R. recently began exporting to Greece.

United Kingdom

MAY JOIN OTHER COUNTRIES IN FISHING SOUTH AFRICAN HAKE:

Britain's interest in the South African hake fishery was given new emphasis by the British White Fish Authority (WFA) in late February 1966. WFA reported it was working with South African scientists to assess the long-term prospects of the southern groundfish resource. WFA said: ". . . it is essential to look for alternative stocks for British vessels . . . ." Britain fears its traditional fishing grounds may be depleted by foreign fleets. Ironically, South Africa has exactly the same fears about its fishery resources and has declared a 12-mile fishing limit.

In late 1965, about 100 foreign fishing vessels were fishing groundfish off South Africa. Spain and the U.S.S.R. each had about 40 vessels there and at least 8 other countries had vessels in the area. The foreign vessels were fishing fairly close to shore, but beyond South Africa's declared 12-mile fishing limits. In an editorial proposing international regulation of the southern groundfish resource, Fishing News International said: "While these are still the early, turbulent days of long-range fishing, they are already showing that reluctant 'hosts' will get nowhere by standing on the cliff tops and shouting at the factoryships and freezer trawlers on the horizon." (Various sources.)

Venezuela

NEW RESEARCH VESSEL "LA SALLE" DELIVERED FROM NORWAY:

The 130-foot oceanographic and fisheries research vessel La Salle was delivered in late 1965 by a Norwegian shipyard to the La Salle Foundation of Natural Sciences in Caracas, Venezuela.

The vessel is equipped with laboratories for marine biology and oceanography. The laboratories are specially insulated against sound and vibration. The vessel carries 20 Nansen bottles, electronic fish-detecting and charting equipment, hydraulic winches for scientific instruments, and gear for both stern trawling, purse-seining, and long-line fishing. Facilities for holding fish alive, a freezing room of 700 cubic feet, and a refrigerated fish hold of 5,100 cubic feet, are also provided on the vessel.

Specifications of the La Salle are length 130 feet, breadth 31 feet, depth 13½ feet, deadweight about 300 tons, and main diesel engine 800 brake horsepower giving a cruising speed of 11.5 knots. The vessel has accommodations for 20 men.

New Venezuelan fisheries research vessel La Salle.

During the first 6 months of operation, the La Salle will have a complete Norwegian crew, and the Norwegian officers will stay on board for a year.

The cost of the vessel was about US$550,000. (The Export Council of Norway, December 1965.)

Yugoslavia

FISH MEAL IMPORTS:

In the first half of 1965, Yugoslavia imported over 17,000 metric tons of fish meal, almost all of it from Peru. (U. S. Embassy, Belgrade, March 1966.) Comparative data for Yugoslavian fish imports in 1963 and 1964 are given in the table below:

Yugoslavian Fish Meal Imports, by Country of Origin

Country	First Half of 1965	1964	1963
	(Metric Tons)		
United States	0	0	4,000
Peru	17,019	33,769	19,307
Italy	16	0	0
Total	17,035	33,769	23,387

Foreign Fishing Off United States Coasts, March 1966

OFF ALASKA:

Soviet: The number of Soviet fishing vessels off Alaska increased slightly during March. Early in April about 200 Soviet vessels were fishing off Alaska as compared to about 150 vessels in early March. This is about the same as last year at that time.

The Gulf of Alaska remained the center of Soviet fishing efforts with well over 100 medium and large trawlers and support vessels in the Pacific ocean perch fishery.

During March, two ocean perch fleets of about 35 vessels each operated on the Portlock Bank (east of Kodiak Island) and on the Continental Shelf off Yakutat. A third fleet of about 30 vessels was dispersed along the 100-fathom curve from Cape Spencer to Dixon Entrance (off southern Central Alaska).

Fig. 1 - A Soviet trawler fishing in the Bering Sea.

Towards the end of March there was a shift away from the Yakutat grounds: some vessels joined the Portlock Bank fleet; others went north for the Bristol Bay flounder fishery. In early April no more than 20 vessels remained off Yakutat. During the first 3 months of 1966, the Soviet fishing fleets caught over 30,000 metric tons of Pacific ocean perch in the Gulf of Alaska.

The Soviet shrimp fleet in the Gulf of Alaska consisted of 14 medium refrigerated trawlers (class SRTM) operating on the shrimp grounds near Shumagin Islands. The fleet was supported by one refrigerated carrier. During the first three months of 1966, this fleet caught over 4,000 metric tons of shrimp, 30 percent above the January-March production quota. If the Soviets continue fishing for shrimp with such good results, they will soon exceed their 6,000-ton quota for 1966.

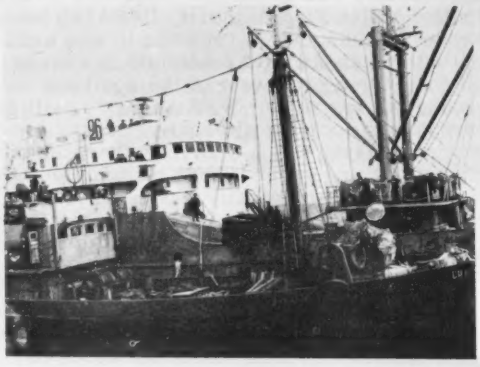

Fig. 2 - Soviet medium trawler alongside refrigerated vessel in eastern Bering Sea. Note deck arrangement and fishing gear on trawler.

The flounder fishery this year began in late February when the Soviets shifted their herring fishing effort in the Central Bering Sea to the flounder fishery because their exploratory vessels were unable to locate sufficient herring. By early March about 30-40 vessels fished for flounder north of the Unimak Island on the Continental Shelf in 40-50 fathoms. By early April, this fleet doubled and reported good catches. Flounder is frozen and taken back to the Siberian Mainland, where half is sold as landed and the other half canned.

At least three large crab factory vessels departed Vladivostok the last week of March. This indicated that Soviet king crab fishing in Bristol Bay began about the same time as in previous years. Soviet king crab catches in the east Bering Sea decreased considerably in 1965 after the U.S.-U.S.S.R. agreement on king crab fishing early 1965. In 1964 the Soviets fished in Eastern Bering Sea from April-July using 3 king crab factoryships, 9 net-setting medium trawlers, and 33 pick-up boats. With this fleet of 45 king crab fishing vessels, the Soviets landed 2.8 million male crabs and produced about 72,000 cases of canned crab. In 1965, the same number of vessels operating from April to June caught 2.2 million crabs but produced only about 45,000 cases, a decrease of 37.6 percent and an indication that smaller crabs were landed. In 1965, the Soviets ended crab fishing in the

Eastern Bering 1 month earlier than in previous years, probably to fish in other parts of the Bering sea for saury, pollock, and other species. Despite the effort, the Soviet Far Eastern crab fleet failed to meet its yearly production quota in 1965.

Japanese: At the end of March about 60 Japanese fishing vessels were operating off Alaska. Three Japanese factoryships were in the Bering Sea, presumably for Alaska pollock. One factoryship, accompanied by 11 trawlers, was located about 100 miles west of the Pribilof Islands. The second factoryship, with six trawlers, continued operations about 50 miles north of Unalaska Island. The remaining factoryship, accompanied by about 30 trawlers, fished about 150 miles west of Port Moller.

Fig. 3 - Japanese king crab factoryship operating in North Pacific.

One of the three Japanese factory trawlers reported fishing in March in the Bering Sea Triangle Area north of Unalaska Island returned to Japan. The two remaining trawlers continued fishing in the same area. Two additional Japanese factory trawlers continued to fish off the central Aleutians.

Fig. 4 - Sorting and weighing crab meat prior to freezing aboard a Japanese crab factoryship in North Pacific.

A crab factoryship with five net-setting trawlers operated on the outer Bristol Bay "flats" about 150 miles west of Port Moller.

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OFF PACIFIC NORTHWEST:

Soviet: In early March large concentrations of Soviet fishing vessels (which were reported in February fishing from Dixon Entrance to Queen Charlotte Sound) switched north off Central Alaskan waters. A few large stern trawlers and medium trawlers, however, remained in the general area of Queen Charlotte Sound presumably fishing for Pacific ocean perch.

Throughout February 1966, the research vessel Adler was observed conducting fishery explorations off the Pacific coasts. On February 17, she was sighted about 17 miles west of Coos Bay, Oregon. By February 22, the Adler was off Willapa Harbor, Washington. At the end of the month she docked in Vancouver, British Colombia (Canada), to get supplies and fuel. In March 1966, the Adler was reported off the California coast, according to Soviet sources.

The American Telephone and Telegraph Company's underwater cable which runs between Seattle and Alaska has been severed twice since the Soviet fleets began fishing off Dixon Entrance early 1966. The second break, which occurred on January 24, 1966, forced the company to bring its cable repairship all the way from Hawaii. The ship remained in the area until March 5 patrolling the cable areas.

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IN NORTHWEST ATLANTIC:

Soviet: In early March Soviet fishing activities in the Northwest Atlantic off U. S. coasts were particularly heavy when 71 fishing vessels (including 52 large stern trawlers) were sighted during one single surveillance flight. By mid-month, however, it was observed that fishing was poor (lack of fish on decks of Soviet trawlers) and by March 16 only about 30 Soviet fishing vessels were sighted in the Northwest Atlantic. The rest switched to hitherto little exploited mid-Atlantic waters off New Jersey and Virginia.

Soviet fishing vessels on Georges Bank during March showed a slight increase over the previous month. A total of 107 vessels were sighted as compared with 92 vessels

sighted during February 1966, and 42 vessels in February 1965. The vessels sighted in March were identified as 67 factory stern trawlers, 6 processing and refrigerated freezer trawlers, 19 side trawlers, 4 medium side trawlers, 6 refrigerated transports, 1 factoryship, 2 fuel and water carriers, 1 tug, and 1 passenger transport. Fishing operations ranged along the 100-fathom curve of the Continental Shelf from south of Long Island (Hudson Canyon), eastward to the southwest and southeast parts of Georges Bank (Lydonia and Corsair Canyons). These same areas were fished by the Soviets also in 1965 and like then catches were primarily whiting and red hake.

Fig. 5 - Soviet processing and refrigerated factoryship operating in Northwest Atlantic. Standing by are Pioneer-class Soviet trawlers.

The Soviet fleets, operating in groups of 30 to 40 vessels, were located 50 to 70 miles south of Block Island, and 30 to 40 miles south and southeast of the Nantucket lightship. They also fished in the southeast part of Georges Bank.

Spanish: A U. S. fishing vessel from Boston reported that a fleet of about 30 Spanish trawlers began pair-trawling in the southeast part of Georges Bank. Presence of Spanish trawlers was confirmed; at least 15 were sighted near Corsair Canyon during March surveillance patrols.

Boarding of Polish Trawler "Virgo": On April 1, 1966, a Polish trawler (the Virgo GDY-309) requested permission from the U. S. Coast Guard to enter the Port of Boston for repairs to its trawl winch. A boarding party, including U. S. Bureau of Commercial Fisheries personnel, inspected the vessel, which remained in Boston until April 8.

The Virgo is one of 14 Polish stern trawlers (2,800 gross tons each) fishing for cod off Labrador. In May they were expected to switch to the Atlantic Ocean perch fishery. The Virgo's yearly quota is 5,200 metric tons of frozen fish (exclusive of fish meal). Part of the catch is packed in English-labeled cartons, landed at St. Pierre et Miquelon (French) and transhipped aboard Canadian transports to the United States.

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OFF MID-ATLANTIC COASTS:

Soviet: During March, two surveillance flights were conducted along the middle Atlantic Coast areas in response to reports concerning substantial Soviet fishing activity from southeast of Cape May, N. J., to Cape Hatteras, N. C. A total of 34 Soviet vessels were sighted on the 2 flights and identified as 31 factory stern trawlers, 2 processing and refrigerated freezer trawlers, and 1 fuel and water carrier.

Twenty-three of the 34 vessels were located in a 60-mile area from 70 miles east of Cape Henry, Va., to 70 miles southeast of Cape May, N. J. Moderate catches of fish on deck appeared to be primarily whiting with lesser amounts of scup (porgies). All vessels were using heavy bottom-tending trawls.

The remaining 11 vessels were located in a 30-mile area 90 miles east of Atlantic City (Hudson Canyon). Those vessels engaged in fishing operations had heavy to moderate catches on deck--primarily red hake and whiting. Several vessels were under way heading in a southerly direction.

This was the largest concentration of Soviet fishing vessels ever observed as a result of periodic surveillance flights along the mid-Atlantic areas. Soviet fishing activity in those areas was negligible in 1965. In the spring of 1964, however, factory stern trawlers and 12 side trawlers did fish for scup off the Virginia and North Carolina coasts.

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IN THE GULF OF MEXICO AND CARIBBEAN:

Soviet: Like in 1965, there has been an increase of Soviet fishing activities in the Gulf of Mexico and Caribbean. It is believed that at least a dozen or more medium and large trawlers fished for various species in early

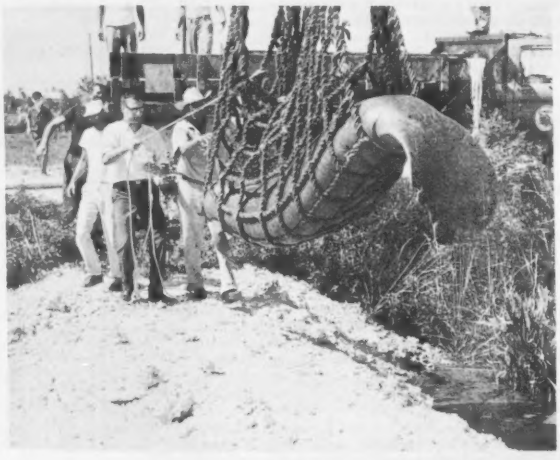
April 1966. That the U.S.S.R. must have a considerable number of vessels in the area is evident from the fact that in February the Soviet passenger ship Baltika arrived at Havana, Cuba, with about 350 Soviet fishermen aboard. They replaced Soviet fishermen who were due to go home on leave.

SEA COWS SHOW PROMISE AS "WEED CONTROLLERS"

A sea cow safari into the jungles of Panama was made in late September 1965 by State officials of the Florida Central and Southern Flood Control District (FCD).

The possibility of using manatees (knows as sea cows) to control aquatic weeds is being studied under a Florida State project as well as under a Federal project in the Canal Zone.

Manatees can grow to more than 12 feet in length. They are strict vegetarians and have proved to be excellent weed eaters. But aside from their eating habits, not too much is known about these unusual mammals. More information is needed about their life cycle, particularly their rate of reproduction.



In June 1964 a manatee was lowered into a fenced-off section of a canal in Florida. That was the start by the Central and Southern Florida Central District of a three-year study of manatees and their usefulness in controlling aquatic weeds.

The Panama visit was planned to give Florida researchers an opportunity to visit a remote area in the Panamanian jungle where 5 adult sea cows and a juvenile were penned in a 7-acre lagoon. The visit also provided a valuable opportunity to exchange information.

The Florida Central and Southern FCD is currently spending $200,000 a year to keep its waterways clear of vegetation. Unless some new method of weed control is discovered--such as the use of manatees--the District's weed control costs may increase to $500,000 a year when the Flood Control Project is completed.

The total cost of aquatic weed control in Florida--including expenditures by cities, counties, drainage districts, individuals, and State and Federal agencies--runs into several million dollars annually. It is estimated that if weeds were left untreated, all the inland waterways in the southern United States would be choked with vegetation and impassable to navigation within 3 years. (News Release Central and Southern Florida Flood Control District, West Palm Beach, Fla.)

Note: See Commercial Fisheries Review, Oct. 1964 p. 107 and Dec. 1964 p. 106.

FEDERAL ACTIONS

Department of the Interior

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT

FEDERAL AID FOR FISHERY PRODUCTS: Following is a listing of the approved projects under the Commercial Fisheries Research and Development Act--Public Law 88-309, which is administered by the Department of the Interior's Bureau of Commercial Fisheries. The list includes those projects approved through December 31, 1965.

Public Law 88-309, which was signed by the President on May 20, 1964, provides for payment of $5 million annually to States for commercial fishery research and development over a five-year period. The States will be required to provide matching funds equal to at least 25 percent of project costs.

State	Project	Title	Total First Year Cost	Date Approved
Alaska	5-9-R	Investigations of Ecological Factors Limiting Production of the Alaskan Pandalid Shrimp	$ 25,000	11/18/65
Alaska	5-6-R	Cook Inlet Sockeye Salmon Investigations	50,000	10/1/65
Alaska	5-3-D	Expansion of Current and Development of Additional Commercial Fisheries Catch, Production and Gear Statistics	13,500	10/1/65
Alaska	5-4-R	Pink Salmon Optimum Escapement and Forecast Research	5,500	10/1/65
Alaska	5-7-R	Investigation of Factors Limiting the Production of Sockeye Salmon in Lakes	22,000	10/1/65
Alaska	5-10-R	Dungeness Crab Research in Southeastern Alaska	15,600	10/1/65
Alaska	5-11-R	Reproduction of King Crabs in the Kodiak Island Area	46,100	10/1/65
Alaska	5-8-R	Monitoring the Effects of Land Use on Salmon Production	15,800	8/18/65
Alaska	5-1-S	Coordination	33,000	8/25/65
Alaska	5-5-R	Kvichak River Smolt Study	32,000	10/18/65
Arizona	6-1-R	Investigation of Commercial Fishery Potentials in Reservoirs	13,732	12/9/65
California	6-3-R	Fisheries Resources Sea Survey	53,000	12/3/65
California	6-4-R	Shellfish Laboratory Operations	16,460	12/9/65
Delaware	3-8-D	Rehabilitation of the Natural Seed Oyster Beds in Delaware	40,000	7/22/65
Florida	2-11-D	Marketing	257,444	9/15/65
Florida	2-15-R	A Survey of Florida's Commercial Clam Populations	30,000	11/4/65
Georgia	2-10-R	Feasibility Study of Methods for Improving Oyster Production in Georgia	40,300	9/28/65
Idaho	1-1-D	Experimental Rearing of Chinook Salmon and Steelhead Trout at Hayden Creek Ponds	3,300	9/24/65
Idaho	1-9-C	Construction of Hayden Creek Rearing Ponds	23,600	9/24/65
Indiana	4-10-R	Mussel Research Study	16,360	12/16/65
Iowa	4-11-R	Industrial and Commercial Food Fish Investigations	20,000	12/30/65
Kansas	4-1-R	Investigations on Digestion and Metabolism of the Channel Catfish	17,320	7/8/65
Louisiana	2-20-S	Coordination	6,300	11/4/65
Louisiana	2-23-D	Oyster Lease Control Monuments	115,350	12/3/65
Louisiana	2-22-R	Ecology of Louisiana's Estuarine Waters	136,750	12/9/65
Louisiana	2-21-R	Coastwide Study of Penaeid Shrimp	152,400	12/9/65
Louisiana	2-24-D	Shell Planting for Oyster Cultch	65,000	12/1/65
Maine	3-13-D	Maine Marine Fisheries Extension Service	25,464	9/15/65
Maine	3-24-D	Promotion and Market Development	49,100	10/18/65
Maine	3-18-R	Investigation of Physical Aspects of Raw Herring	12,000	12/2/65
Maine	3-12-R	Northern Shrimp - Biological and Technological Research	35,232	12/3/65
Maine	3-14-R	Lobster Research Program	68,819	12/13/65
Maine	3-16-R	Biological, Environmental and Technological Research on Marine Worms	40,000	9/17/65
Maine	3-17-D	Study of the Economic and Operation Feasibility of Mechanization of the Maine Sardine Processing and Canning Operations	35,000	9/15/65
Maryland	3-21-R	Determination of the Distribution and Abundance of the Winter Flounder	13,584	9/21/65
Maryland	3-23-R	Study of the Effects of Thermal Pollution on the Eastern Oyster in the Patuxent River Estuary	8,112	10/4/65
Maryland	3-27-R	Tagging of Juvenile Striped Bass in Chesapeake Bay Estuaries	16,800	11/5/65

(Listing continued on next page.)

State	Project	Title	Total First Year Cost	Date Approved
Maryland	3-28-R	Effects of Municipal and Industrial Waste Discharges on the Marine Resources of the Chesapeake Bay	$ 36,000	10/28/65
Maryland	3-29-R	Studies of the Physical Processes of Movement and Dispersion of Oyster Larvae	18,000	10/29/65
Maryland	3-42-D	An Economic Study of the Fisheries and Seafood Processing Industries with Emphasis on the Chesapeake Bay Area	13,670	12/9/65
Maryland	3-25-C	Construction of Research Laboratory Facility to be Used for Studying Temperature Effects on Estuarine Organisms	4,770	12/9/65
Maryland	3-26-R	Studies of the Physical and Chemical Properties of the Estuarine Environment Associated with Fish Kills	21,000	9/28/65
Maryland	3-30-R	Suspended Sediments in the Upper Chesapeake Bay	24,000	11/5/65
Massachusetts	3-36-D	Design, Fabrication, and Test of a Prototype Improved Fish Washing Box for Otter Trawlers	5,000	11/30/65
Massachusetts	3-37-D	Collection, Compilation, Evaluation and Dissemination of Commercial Fisheries Statistics	21,662	12/3/65
Massachusetts	3-34-R	Mass Production of Larval and Juvenile Shellfish under Laboratory Conditions, and Investigations upon their Survival and Rate of Growth under Natural Conditions	57,500	12/22/65
Michigan	4-2-R	Surveillance of Lake Trout Restoration in Michigan Waters of Lake Michigan	33,750	7/23/65
Minnesota	4-8-R	Minnesota Commercial Fisheries Improvement	10,416	9/15/65
Mississippi	2-25-R	Population Studies of Exploited Crustaceans and Fishes in a Northern Gulf of Mexico Estuary with Special Reference to the Effects of Brood Success on Commercial Availability	97,291	12/8/65
Missouri	4-3-R	Research and Management of Commercial Fisheries	17,208	9/15/65
Montana	1-20-C	Construction of Fishery Research Vessel for Fort Peck Reservoir Fishery Investigation	20,000	12/20/65
Montana	1-19-D	Fort Peck Reservoir Fishery Investigations	20,000	12/16/65
New Hampshire	3-31-R	Soft-shell Clam Population Study in Hampton-Seabrook Harbor, New Hampshire	4,800	11/4/65
New Hampshire	3-32-R	An Investigation of the Possibility of Seed Oyster Production in Great Bay, New Hampshire	24,900	11/4/65
New Jersey	3-1-D	Shell Planting Program - Maurice River Cove and Mullica River	200,000	6/25/65
New Jersey	3-2-R	Evaluation of the Menhaden and Shad Fishery in Delaware Bay and Adjacent Waters	22,002	7/19/65
New York	3-11-D	Pilot Plant Depuration of Hard Clams	39,000	9/15/65
New York	3-9-D	Management Planning for New York Freshwater Commercial Fisheries	24,000	11/4/65
North Carolina	2-9-R	Studies on Macroplanktonic Crustaceans and Ichthyoplankton of the Pamlico Sound Complex	12,000	9/29/65
North Carolina	2-6-R	Oyster Studies	24,200	8/6/65
North Carolina	2-8-R	A Study of the Quality of North Carolina Scallops	12,500	8/17/65
North Carolina	2-26-R	Shrimp Studies	28,334	12/8/65
Ohio	4-6-R	Lake Erie Commercial Fisheries Research	48,000	9/15/65
Oregon	1-10-D	Development of the Shad Industry	16,250	12/14/65
Oregon	1-12-R	Utilization of Hake, Dogfish, and By-products of the Fillet Industry for Protein Supplements	16,000	12/16/65
Oregon	1-14-D	Utilization of Shrimp Waste	11,100	12/16/65
Oregon	1-3-R	Study on the Distribution & Abundance of Pink Shrimp in the Pacific Ocean off Oregon	30,291	9/17/65
Oregon	1-5-R	Controlled Rearing of Dungeness Crab Larvae and the Influence of Environmental Conditions on their Survival	10,212	9/17/65
Oregon	1-4-R	Investigation of the Abundance and Recruitment of Bottomfish and Pacific Ocean Perch	20,802	9/21/65
Oregon	1-8-S	Coordination	5,000	7/23/65
Oregon	1-15-R	Processed Hake in Feed for Mink	6,000	9/15/65
South Carolina	2-1-C	Construction of Large Size Shrimp Farm Pond, to Demonstrate the Economic Potential of Shrimp Culture	9,928	7/8/65
South Carolina	2-3-R	To Manage and Practice Aquaculture in a Large Size Shrimp Farm Pond	6,960	7/8/65
South Carolina	2-2-R	Charting of Subtidal Oyster Beds and Experimental Transplanting of Seed Oysters thereto from Polluted Seed Oyster Beds	17,804	7/19/65
Tennessee	4-5-R	Development of Improved Fishing Methods for Use in South Eastern & South Central Reservoirs	27,334	9/15/65
Texas	2-12-R	An Evaluation of the Effects of Estuarine Engineering Projects	13,440	10/18/65
Texas	2-13-C	Construction of a Gulf Research Vessel	85,000	10/22/65
Texas	2-14-C	Coastal Fisheries Experiment Station	45,000	10/22/65
Virginia	3-5-D	Investigation of Potential for Expansion of the Industrial Fishery of the Mid-Atlantic Bight	49,849	9/17/65
Virginia	3-7-R	Investigations of Oyster Larvae and Spat and Certain Important Environmental Factors in an Horizontally Stratified Estuary	140,800	9/15/65
Virginia	3-19-R	Characterization of Coastal and Estuarine Fish Nursery Grounds as Natural Communities	30,100	9/17/65
Washington	1-21-C	Construction of Small Fishways	22,000	12/16/65

(Listing continued on next page.)

State	Project	Title	Total First Year Cost	Date Approved
Washington	1-17-S	Coordination of Projects under P.L. 88-309	$ 12,000	9/28/65
Washington	1-18-R	Investigation of Effects of Specific Areas of Grays Harbor on the Emigration of Yearling Coho Salmon from the Rivers Emptying into that Harbor	4,667	11/18/65
Wisconsin	4-7-R	Assessment of Lake Trout Restoration in the Wisconsin Waters of Lake Michigan	27,333	9/15/65

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FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

REQUEST TO U. S. FOOD AND DRUG ADMINISTRATION FOR APPROVAL OF FISH PROTEIN CONCENTRATE MADE FROM FISH:

Secretary of the Interior Udall submitted in late February 1966, a petition to the Food and Drug Administration (FDA) to approve as a food additive a protein concentrate made from whole fish by researchers of Interior's Bureau of Commercial Fisheries.

The marine protein concentrate, made from Atlantic hake in the experiments, is approximately 80 percent protein. The remaining 20 percent is made up largely of beneficial minerals. Approximately six pounds of fish are processed to produce one pound of a concentrate that is virtually odorless and tasteless. The Bureau's model unit plant at Beltsville, Md., has a capacity of 100 pounds a day.

Bureau researchers have found that the product blends well with other forms of food. It was successfully tested as an ingredient in beverages, noodles, gravy, bread, and cookies. The addition of marine protein concentrate to those products materially increases their nutritive value.

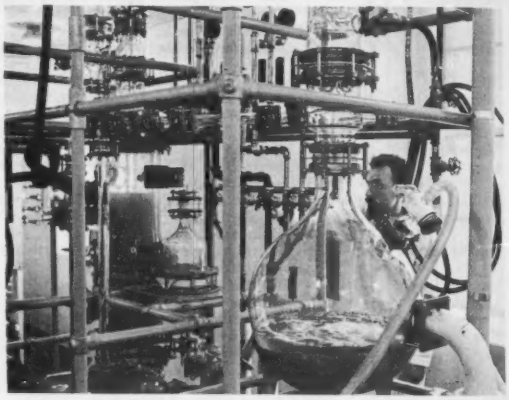

Fig. 2 - Scientist conducting solvent extraction experiments with large glass laboratory equipment, Bureau of Commercial Fisheries Technological Laboratory, College Park, Md.

Secretary Udall told FDA that Bureau scientists worked for 3 years to develop pro-

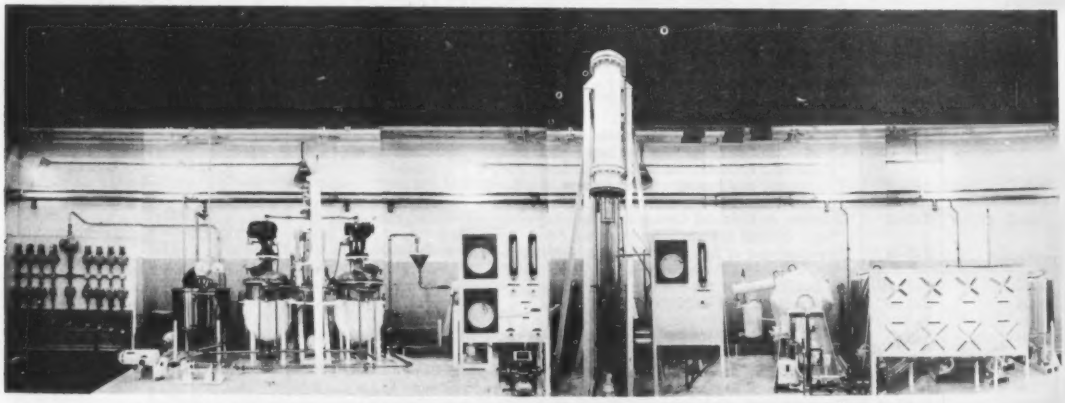

Fig. 1 - Extraction model unit for the manufacture of marine protein concentrate by use of solvent, Bureau of Commercial Fisheries Food Engineering Research Laboratory, Beltsville, Md.

cedures for manufacturing a nutritious and completely wholesome product. Late in 1965, the results of their tests were reviewed by the Marine Protein Resource Development Committee of the National Academy of Science. On December 1, 1965, the Academy advised the Secretary that "in the Committee's judgment, fish protein concentrate from whole hake, as prepared by the Bureau's process, is safe, nutritious, wholesome, and fit for human consumption."

The Director of the Bureau of Commercial Fisheries said the concentrate can contribute much to ending "protein starvation," the most urgent food problem of the century, for about two-thirds of the world's population. He said studies show that if only the unharvested fish in United States coastal waters were made into the concentrate, it would provide the additional high quality protein to balance the diet of one billion people for 300 days at a cost of about a half cent per person per day.

Notice of the Department of the Interior's petition appeared in the Federal Register, March 2, 1966.

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INCREASED INTEREST RATE ON FISHERIES LOANS EFFECTIVE APRIL 1, 1966:

An increase in the interest rate on fisheries loans from 5 to 5½ percent as proposed on March 1, 1966, by the Department of the Interior's Bureau of Commercial Fisheries became effective April 1, 1966. (Federal Register, March 29, 1966.)

Interested persons were given 20 days within which to submit written comments, suggestions, or objections with respect to the proposed increase. No comments, suggestions, or objections were received.

Donald L. McKerman, Director of the Bureau of Commercial Fisheries, which administers the loan program, explained that the increase is necessary to make the rate consistent with interest rates on other public loans of comparable maturity.

The fisheries loan fund was established by a section of the Fish and Wildlife Act of 1956, which authorized the Secretary of the Interior to make loans for financing and refinancing the operations of commercial fishing vessels and gear. The Department of the Interior is authorized to make such loans through June 30, 1970.

Another provision of the loan fund legislation states that the purchase of a new vessel must not cause economic injury to efficient vessel operators working in the area where the new vessel will operate.

The loan program has filled the credit gap for fishermen, insuring the continued operation of their vessels, and is helping to upgrade and modernize the commercial fishing fleet of the United States.

Notice of the proposed rate increase as it appeared in the Federal Register, March 5, 1966, follows:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 250]

FISHERIES LOAN FUND PROCEDURES

Change of Interest Rate

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742c), it is proposed to amend Part 250, Title 50 Code of Federal Regulations, as set forth below. Public Law 89-85 amended section 4 of the Fish and Wildlife Act of 1956 by providing that any fisheries loans shall "Bear an interest rate of not less than (a) a rate determined by the Secretary of the Treasury, taking into consideration the average market yield on outstanding Treasury obligations of comparable maturity, plus (b) such additional charge, if any, toward covering other costs of the program as the Secretary may determine to be consistent with its purpose." The average market yield of outstanding Treasury obligations of comparable maturity has risen substantially since passage of the Act. The purpose of this amendment is to increase the interest rate charged on fisheries loans authorized on and after the effective date of the amendment from 5 percent to 5½ percent.

This proposed amendment relates to matters which are exempt from the rule making requirements of the Administrative Procedure Act (5 U.S.C. 1003); however, it is the policy of the Department of the Interior that, whenever practicable, the rule making requirements be observed voluntarily. Accordingly, interested persons may submit, in triplicate, written comments, suggestions, or objections with respect to the proposed amendment to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C., 20240, within 20 days of the date of publication of this notice in the FEDERAL REGISTER.

Section 250.10 is amended by deleting "5 percent" and substituting "5½ percent" therefore.

DONALD L. MCKERNAN,
Director,
Bureau of Commercial Fisheries.

MARCH 1, 1966.

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APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Charles L. and B. J. Johnson, Box 18, Anchor Point, Alaska 99556, for the purchase of a used 42-foot overall length wood vessel to engage in the fishery for salmon, halibut, shrimp, and crabs. Notice of the application was published by the U. S. Department of the Interior's Bureau of Commercial Fisheries in the Federal Register, March 8, 1966.

Ronald Divers Watson, Route 1, Box 398, Marysville, Wash., 98270, for the purchase of a 37.5-foot overall length wood vessel to engage in the fishery for salmon. Notice of the application was published in the Federal Register, March 8, 1966.

Charles W. Beyers, 210 Ladera Court, Santa Cruz, Calif. 95061, for the purchase of a used 30-foot wood vessel to engage in the fishery for salmon and bottomfish. Notice of the application was published in the Federal Register, March 12, 1966.

James Mathew Torgerson, 1103 Fairfield St., Aberdeen, Wash. 98520, for the purchase of a used 73.6-foot registered length wood vessel to engage in the fishery for hake, bottomfish, herring, and crab. Notice of the application was published in the Federal Register, March 12, 1966.

Jack E. McFarland, 12012 36th Ave. NE. Seattle, Wash. 98125, for the purchase of a used 39.2-foot registered length wood vessel to engage in the fishery for salmon, albacore tuna, and halibut. Notice of the application was published in the Federal Register, March 12, 1966.

Howard Jake Bowman, Box 574, Seadrift, Tex. 77983, for the construction of a new 39-foot wood vessel to engage in the fishery for shrimp. Notice of the application was published in the Federal Register, March 17, 1966.

Robert Joseph Chasse, P. O. Box 201, Ketchikan, Alaska 99901, for the purchase of a used 40-foot wood vessel to engage in the fishery for salmon and halibut. Notice of the application was published in the Federal Register, March 31, 1966.

Karl Rosenberg and Hartzel West, Box 225, Seldovia, Alaska 99663, for the purchase of a used 29.8-foot registered length wood vessel to engage in the fishery for salmon. Notice of the application was published in the Federal Register, March 31, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).
Note: See Commercial Fisheries Review, April 1966 p. 77.

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HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Ralston Purina Co., Van Camp Division, 840 Van Camp St., Long Beach, Calif., 90802, has applied for a fishing vessel construction differential subsidy to aid in the construction of a 170-foot overall length steel vessel to engage in the fishery for tuna. A hearing on the economic aspects of this application was scheduled to be held. The U. S. Department of the Interior's Bureau of Commercial Fisheries published the notice of the application and hearing in the March 8, 1966, Federal Register.

Trawler Jeanne d'Arc, Inc., Tillson Wharf, Rockland, Maine 04841, has applied for a fishing vessel construction differential subsidy to aid in the construction of a 114-foot overall length wood vessel to engage in the fishery for groundfish, scallops, lobsters, and flounders. A hearing on the economic aspects of this application was scheduled to be held. The Bureau published the hearing notice in the March 8, 1966, Federal Register.

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HUTCHINSON NAMED TO HEAD INTERNATIONAL TRADE PROMOTION IN FISHERIES:

The assignment of Samuel J. Hutchinson of Seattle, Wash., to the newly created post of Chief, Office of International Trade Promotion, Bureau of Commercial Fisheries, Washington, D. C., effective March 15, 1966, was announced by the U. S. Department of the Interior.

Hutchinson, 58, has been Director of the Bureau's Pacific Regional Office with head-

quarters in Seattle since 1957. Earlier he was Assistant Regional Director in Portland, Oreg., for about nine years.

Samuel J. Hutchinson

The new position was created to help the domestic fishing industry increase its exports by introducing American fishery products abroad--thus developing new markets--and by participating in international trade fairs and trade missions.

Hutchinson was selected for the assignment because his 34 years in commercial fisheries has given him wide experience in scientific and administrative responsibilities. He brings to his new position extensive knowledge of the entire domestic fishing industry, including the foreign market potential of king crab, Alaskan shrimp, and canned and frozen Pacific salmon as well as the many other fishery products produced in the United States.

Hutchinson will organize the Foreign Trade Expansion Program with the cooperation of industry and Government agencies. His analyses of world market conditions will determine the direction and goals of the program. He will advise the fishing industry on ways and means of developing markets in foreign countries and he will be responsible for encouraging United States firms to participate in the program. He will represent the Bureau at national and international fishery meetings, and participate in meetings with policy-making officials of foreign governments to explain United States export practices and programs.

A native of Sunnyside, Wash., Hutchinson received a Bachelor of Science degree in fishery biology from the University of Washington's College of Fisheries and also took graduate courses at the University. He entered the Federal service with the old Bureau of Fisheries, then part of the Department of Commerce, in 1931.

U. S. Tariff Commission

VALUATION LAWS OF THE UNITED STATES AND OF THE PRINCIPAL TRADING PARTNERS OF THE UNITED STATES:

In response to a resolution of the Committee on Finance of the United States Senate, dated February 9, 1966, the U. S. Tariff Commission has instituted an investigation to determine the methods of valuation used by the United States and by its principal trading partners in determining the duty applicable to imports.

The resolution directs the Commission to submit to the Senate Finance Committee not later than June 30, 1966, a preliminary report containing (a) a description of the methods of valuation used by the United States and of the principal trading partners of the United States (including those instances where valuation is in excess of the landed values) and (b) a comparative analysis of the basic differences between such methods of valuation and the valuation results they produce.

The resolution further directs the Commission to submit a final report not later than February 28, 1967, which shall include suggestions and recommendations for improvement of the customs valuation laws of the United States, including the Commission's views as to the feasibility and desirability of adopting the Brussels definition of value for customs purposes and as to means appropriate for adopting such definition of value with the least practicable effect on trade. (The Brussels definition of value was established under the Convention on Valuation of Goods for Customs Purposes, signed on December 15, 1950.)

The Commission urged all interested parties to submit written views pertinent to the investigation.

Department of the Treasury

U. S. COAST GUARD

ASSISTANCE TO NEW ENGLAND FISHING FLEET IN 1965:

The U. S. Coast Guard Search and Rescue Branch of the First Coast Guard District (all New England states except Connecticut) as-

sisted 235 commercial fishing vessels in the New England area during 1965.

Engine failure accounted for 152 of the causes for need of assistance, or 64 percent of the total calls for aid. Included in this category were situations where the main propulsion engine was unable to operate from a variety of ills such as fuel pump failure, clutch trouble, starting engine failure, bent or lost propellor, and broken shafts.

There were 28 vessels disabled due to the fouling of nets or towing wires in propellors. While further information is not available, it is assumed that the vessels' own fishing nets were the offenders in most cases, and not nets discarded by foreign vessels.

A total of 22 vessels requested medical advice for treatment of ill or injured crew men. In 14 of those emergencies Coast Guard rescue units evacuated the seamen by helicopter lifts and sped them to the nearest U. S. Public Health Service hospital. Medical advice from USPHS physicians, relayed to vessels through Coast Guard channels, played an important part in those operations.

Vessels in distress from taking water comprised slightly over 8 percent of the calls, or 20 in number. The furnishing of emergency water pumps by Coast Guard helicopters or surface craft played an important part in assisting vessels in danger of sinking. Seven vessels were saved by emergency dewatering equipment delivered by the Coast Guard on the high seas. The other craft were either towed or escorted to safety.

The lone fire reported ended in the destruction of the Boston based otter trawler Magellan on Georges Bank October 15, 1965. All crew members were rescued by the trawler Clipper.

In addition, New England lost 11 other fishing vessels in 1965. Among them was the tragic destruction of the scalloper Snoopy and the loss of 8 of its 11-man crew off the Virginia Capes by a live torpedo. The torpedo, snagged in the scallop dredge, exploded while the crew struggled to release the lethal weapon.

New Bedford lost 5 vessels, Portland-based vessels accounted for 3 losses, Gloucester recorded 2 founderings, while Boston and New London, Connecticut, fleets were each reduced by the loss of a single vessel.

With the exception of the heavy loss of life involved in the explosion of the Snoopy, the New England fleet escaped with the loss of 2 fishermen in 1965. Both casualties occurred on board New Bedford-based craft. The small trawler Susie O. Carver disappeared with her lone crew member while en route from Plymouth to New Bedford. Wreckage from the vessel was later found near the eastern entrance of the Cape Cod Canal.

One man was lost when a small dragger en route from New Bedford to the fishing grounds early in the morning of June 17, struck a submerged object, filled rapidly, and sank within a few minutes.

* * * * *

HEARING ON PROPOSED CHANGES IN NAVIGATION AND VESSEL INSPECTION RULES AND REGULATIONS:

The Merchant Marine Council held a meeting March 21, 1966, in Washington, D. C., for the purpose of receiving comments, views, and data on the proposed changes in the navigation and vessel inspection rules and regulations as set forth in the MMC Public Hearing Agenda, CG-249 dated March 21, 1966.

Of particular interest to the operators of commercial fishing vessels in the 200-gross-tons-and-over class is the Amendment to Subchapter P - Manning of vessels that provides that vessels equipped with full pilothouse control of the propulsion machinery would not be in violation of the rules if the vessel had in her service only a licensed chief engineer.

Present regulations require that two licensed engineers (one a chief engineer) shall be on board in charge of running the vessel's engine. The amendment reads - Add: However, uninspected vessels of 200 gross tons and over which are equipped with full pilothouse control of the propulsion machinery and on which there is no need for a person on watch at all times in the engineroom would not be in violation of 46 USC 224a if the vessel had in her service an appropriately licensed chief engineer.

Notice of the hearing appeared in the Federal Register, February 25, 1966.

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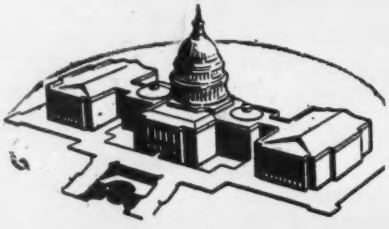
REPORTS OF FOREIGN FISHING VESSELS WITHIN 200 MILES OF U. S. TERRITORIAL WATERS:

There has been an increase in the number of foreign flag-fishing vessels approaching the shores of the United States, according to the U. S. Coast Guard, Washington, D. C., in January 1966. In order to insure that such vessels are not operating in derogation of any laws of the United States, it is essential that all sightings of these vessels be reported promptly to the U. S. Coast Guard, or if more convenient to the nearest agent of the Department of the Interior's Bureau of Commercial Fisheries, who will in turn report to the Coast Guard. Commercial fishermen, party boat operators or any other persons sighting such vessels are requested to report as much of the following information concerning the sightings as practical:

(a) Name and/or number of vessel.
(b) Home port.
(c) Flag displayed.
(d) Date, time and position of vessel sighted.
(e) Estimated course and speed of vessel sighted.
(f) Any identifying configuration.

Eighty-Ninth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.



ANTIDUMPING ACT AMENDMENT: Rep. Curtis spoke in the House (Congressional Record, Mar. 8, 1966, pp. 5112-5116) concerning H. Res. 405, which he introduced June 1, 1965, directing the President to prepare an international agreement to harmonize the administration of the antidumping laws and regulations of all nations. He inserted in the Record various material in support of his proposal. Also, he explored some objections to the provision of the Herlong-Hartke bill (H.R. 8510) which would amend the 1921 Antidumping Act, under which our present antidumping program is administered.

CLEAN RIVERS RESTORATION ACT OF 1966: H.R. 13262 (Rodino) introduced in House Mar. 3, 1966, to provide a program of pollution control and abatement in selected river basins of the United States through comprehensive planning and financial assistance, to amend the Federal Water Pollution Control Act, as amended, and for other purposes; to Committee on Public Works.

COMMERCIAL FISHERY RESOURCES SURVEY: Subcommittee on Merchant Marine and Fisheries of Senate Commerce Committee held hearings April 19, 1966, on S. J. Res. 29, to authorize and direct the Bureau of Commercial Fisheries, U. S. Department of the Interior, to conduct a survey of the marine and fresh-water commercial fishery resources of the United States, its territories, and possessions.

COMMITTEE MEMBERSHIP--MERCHANT MARINE AND FISHERIES: The House Mar. 29, 1966, adopted H. Res. 806, increasing the membership of the Committee on Merchant Marine and Fisheries during the remainder of the 89th Congress from 31 members to 32 members.

The House Mar. 30, 1966, adopted H. Res. 807, appointing Rep. Thomas to membership on the Committee on Merchant Marine and Fisheries.

COMMODITY PACKAGING AND LABELING: Introduced in House H.R. 13660 (Patten) Mar. 15, 1966, H. R. 13719 (Schmidhauser) Mar. 16, H. R. 13779 (Vivian) Mar. 17, H. R. 13951 (Hicks) Mar. 23, and H. R. 14155 (McCarthy) Mar. 30, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes; to Committee on Interstate and Foreign Commerce.

Senate Committee on Commerce, Mar. 22, 1966, met in executive session to consider S. 985, proposed Fair Packaging and Labeling Act, but did not conclude action thereon, and was to meet again on Mar. 23.

ECOLOGICAL RESEARCH AND SURVEY: Senate Committee on Interior and Insular Affairs conducted an open hearing Apr. 21, 1966, on S. 2282, to authorize Stewart L. Udall, the Secretary of the Interior, to conduct a program of research, study, and surveys, documentation, and description of the natural environmental systems of the United States, for the purpose of understanding and evaluating the systems.

ESTUARINE AREAS--NATIONAL SYSTEM OF ESTUARINE AREAS: H. R. 13447 (Dingell) introduced in House Mar. 9, 1966, to authorize the Secretary of the Interior in cooperation with the States to preserve, protect, develop, restore and make accessible estuarine areas of the Nation which are valuable for sport and commercial fishing, wildlife conservation, recreation, and scenic beauty, and for other purposes; to Committee on Merchant Marine and Fisheries.

FACTORY-FISHING VESSELS: H. R. 13481 (Pepper) introduced in House Mar. 10, 1966, to assist the domes-

tic commercial fishing industry through the construction of three advanced-design factory fishing vessels; to Committee on Merchant Marine and Fisheries.

FEDERAL MEDICAL-HEALTH APPROPRIATIONS FY 1966: Rep. Hall in extension of his remarks inserted in Congressional Record, Mar. 14, 1966 (pp. 5513-5524), a report compiled by the American Medical Association, tabulating the Federal medical-health appropriations for fiscal year 1966. The Department of Interior's Bureau of Commercial Fisheries is listed with an amount of $656,000 compared to $681,100 last year. The Bureau conducts research projects to determine the possible medical- and health-related implications of fish oils, pesticides, and botulism as applied to fishery products and nutritional studies. Included are the following studies: (1) the effect of dietary oils on blood cholesterol; (2) the nutritional effect of oxidized marine oils; (3) oxidative deterioration of fish and fishery products; (4) fractional distillation of extracted fish oil for medical research purposes; (5) nutritional value of fish protein concentrate; (6) engineering studies to improve the processing methods of fish protein concentrates; (7) pesticide residues in fish and shellfish; and (8) botulism studies.

FISHERIES--OREGON: Rep. Wyatt spoke in the House (Congressional Record, Apr. 7, 1966, p. 7615) concerning the four Russian fishing ships which were dragging for bottom fish very close to the coast of Oregon. He estimated that they were taking one-half million pounds of fish each day. He further stated that he had appealed to the Secretary of State to protest to the Russian Government.... Also, he pointed out the necessity of the United States taking the lead in an effort to resolve the fisheries problem in the Northwest and in Alaska, involving this country, and the Governments of Russia, Japan, and Canada.

FISHING LIMIT OF 12 MILES: Introduced in House H. R. 13375 (Don H. Clausen), H. R. 13376 (Keith), H. R. 13377 (Mathias) Mar. 7, 1966, and H. R. 13479 (Morton) Mar. 10, to establish a contiguous fishery zone beyond the territorial sea of the United States; to Committee on Merchant Marine and Fisheries.

Rep. Mathias inserted in Congressional Record, Mar. 7, 1966 (pp. 4824-4825), a special report published in the January 1966 issue of Salt Water Sportsman titled "Henry 'Hal' Lyman Opines on the Longline Threat," by Hal Lyman.

Rep. Keith in extension of remarks (Congressional Record, Mar. 7, 1966, pp. 4827-4828), pointed out that this bill would reserve our coastal waters for American fishermen by claiming a zone of 9 miles beyond our present 3-mile territorial sea; would also conserve the resources within the 12-mile boundary; would cover only fishing and would imply no additional jurisdiction over these waters. He spoke of his recent trip to the Soviet Union where he witnessed the enormous strides that the Soviets have made in developing their fishing fleets and allied industries. He stated that Russia has a 12-mile territorial limit.

FISHING VESSEL CONSTRUCTION: H. R. 13728 (Tupper) introduced in House Mar. 16, 1966, to provide that whenever the United States constructs certain fishing vessels in foreign shipyards, equivalent vessels shall be simultaneously constructed in domestic shipyards; to Committee on Merchant Marine and Fisheries.

FISH PROTEIN CONCENTRATE PLANTS: Introduced in House H. R. 13347 (Don H. Clausen) Mar. 7, 1966, H. R. 13457 (Wyatt) Mar. 9, H. R. 13722 (Bates) Mar. 16, H. R. 14145 (McDowell) Mar. 30, H. R. 14268 (O'Neill) Apr. 4, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for production by the commercial fishing industry of fish protein concentrate; to Committee on Merchant Marine and Fisheries. Rep. Clausen in Congressional Record, Mar. 7, 1966 (pp. 4834-4835), pointed out that this bill would authorize the Secretary of the Interior to conduct and encourage research with a view to proving the feasibility of fish protein concentrate production; would also authorize the construction and maintenance of a number of experimental fish protein concentrate production plants, which will begin to develop processes to reduce fish to fish protein concentrate in large enough quantities as to make it practical on a commercial basis. He stated that he is hopeful that the Food and Drug Administration will retract its ruling that FPC is unfit for consumption because this means that this product cannot be sold in the United States nor can it be sold overseas under Public Law 480. He stated that it is his understanding that this decision will be reconsidered shortly.

Sen. Douglas spoke in the Senate (Congressional Record, Mar. 14, 1966, pp. 5427-5429), giving an account of some of the recent developments of fish protein concentrate. Senators Bartlett and Morse also made remarks from the floor in support of fish protein concentrate.

Senate Commerce Committee held hearings Apr. 25, 1966, in Aberdeen, Washington, and May 2-3 in Washington, D. C. on S. 2720, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for the production by the commercial fishing industry of fish protein concentrate.

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: Pribilof Island Fur Seal Sales: Hearing before the Subcommittee on Foreign Aid Expenditures of the Committee on Government Operations, United States Senate, 89th Congress, 1st session, to review the Administration of Fur Seal Skin Operations in the Pribilof Islands, Sept. 23, 1965, Part 1, 168 pp., printed. Contents include statements and letters, and testimony of various Federal officials, Senators, and business representatives.

GATT TRADE CENTER IN GENEVA: Sen. Brewster spoke in the Senate (Congressional Record, Mar. 10, 1966, pp. 5288-5289) concerning his recent trip to Geneva representing the United States and the Senate Commerce Committee as congressional advisor to the American delegation to meetings at the GATT Trade Center in Geneva. He stated that he is presently preparing a complete report on the meetings and conferences he attended with the many representatives of different countries who were gathered in Geneva for the GATT (General Agreement on Trade and Tariffs) and UNCTAD (United Nations Conference on Trade and Development) meetings, which were in session simultaneously. Sen. Brewster explained the nature of these two organizations and the extent of present American involvement and participation in other international activities which are centered in Geneva.

HULL INSURANCE FOR COMMERCIAL FISHING VESSELS OF UNITED STATES. H. R. 14346 (Hagan)

introduced in House Apr. 6, 1966, to authorize the Secretary of the Interior to provide hull insurance for commercial fishing vessels of the United States; to Committee on Merchant Marine and Fisheries.

HUDSON RIVER RESTORATION: Introduced in House H. R. 13752 (Burton of California), H.R. 13760 (Joelson), H.R. 13777 (Todd) Mar. 17, 1966, H.R. 13858 (Farnsley) Mar. 22, H.R. 13948 (Udall), H.R. 13956 (Boland), H.R. 13957 (Cabell), H.R. 13958 (Mrs. Kelly), H. R. 13959 (Long of Md.), H.R. 13960 (Minish), H.R. 13961 (Pirnie) Mar. 23, H.R. 13987(Fraser) Mar. 24, H.R. 14060 (Edwards of Calif.) Mar. 29, H.R. 14144 (Krebs), H.R. 14152 (Rodino) Mar. 30, H.R. 14193 (Howard) Mar. 31, and H.R. 14390 (Conyers) Apr. 7, to direct the Secretary of the Interior to cooperate with the States of New York and New Jersey on a program to develop, preserve, and restore the resources of the Hudson River and its shores and to authorize certain necessary steps to be taken to protect those resources from adverse Federal actions until the States and Congress shall have had an opportunity to act on that program; to Committee on Interior and Insular Affairs.

INTERIOR DEPARTMENT APPROPRIATIONS REQUEST, FY 1967: The subcommittee of the Senate Committee on Appropriations Mar. 3, 1966, continued its hearings on fiscal 1967 budget estimates for the Department of the Interior, and related agencies, received testimony from Donald L. McKernan, Director, Bureau of Commercial Fisheries and John S. Gottschalk, Director, Bureau of Sport Fisheries and Wildlife, both of the Fish and Wildlife Service.

Sen. Magnuson spoke in the Senate (Congressional Record, Mar. 15, 1966, pp. 5719-5722) concerning the welfare of the American fisherman and the fishing industry. He spoke in opposition to the Bureau of the Budget cutback of funds for fishery programs in the budget now before the Congress for fiscal year 1967. He stated that the budget for fiscal year 1967 recommends that from the general fund Congress appropriate $28,036,000 for the Bureau of Commercial Fisheries--$8,925,259 less than the general funds appropriated by Congress for the Bureau in the current fiscal year, and lower than its request for fiscal year 1965. In this connection, he inserted in the Record an article published in the Feb. 1, 1966, edition of the Washington Evening Star, titled "Programs Pared for Great Society," by James J. Kilpatrick. Among other things, Sen. Magnuson advised his fellow members of a report that the Soviet Union has discovered large gatherings of hake in the eastern section of the Pacific Ocean--stocks which may well be those which the U. S. is just preparing to harvest on a limited scale. He stated that he plans to urge the Appropriations Committee to adopt an additional funding of $100,000 for the Pacific hake program so that America can achieve its share of this resource and participate on an equal footing in the future conservation of this resource.

H.R. 14215 (Denton) introduced in House Mar. 31, 1966, bill making appropriations for the Department of the Interior and related agencies (includes United States Fish and Wildlife Service and its two Bureaus: Commercial Fisheries, and Sport Fisheries and Wildlife) for the fiscal year ending June 30, 1967, and for other purposes; to Committee on Appropriations.

House Committee on Appropriations filed a report (H. Rept. 1405), Mar. 31, 1966, without amendment on H. R. 14215; to Committee of the Whole House on the State of the Union.

House Apr. 5, 1966, considered H. R. 14215, making appropriations for the Department of the Interior and related agencies (includes United States Fish and Wildlife Service and its two Bureaus: Commercial Fisheries, and Sport Fisheries and Wildlife) for the fiscal year ending June 30, 1967. However, pursuant to a unanimous agreement of Mar. 30, the vote was postponed until Wed. Apr. 6. The House adopted an amendment submitted by Rep. Garmatz to increase appropriations for the Bureau of Commercial Fisheries from $20,292,000 to $20,312,000, which would provide $20,000 for the staffing and operation of the Baltimore Fishery Market News Service Office. Rep. Denton spoke in the House (Congressional Record, Apr. 5, 1966, pp. 7282-7324), concerning several items of major interest in the bill which included Federal aid for commercial fisheries research and development, excess foreign currency authorization, and anadromous fish. Reps. Fascell, Wyatt, and Garmatz also spoke in support of fishery items included in the bill. Rep. Berry spoke in opposition to the increase of funds for the Bureau.

House Apr. 6, passed H. R. 14215.

Department of the Interior and Related Agencies Appropriations for 1967: Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, Eighty-Ninth Congress, 2nd Session; Part 1, Department of the Interior, Bureau of Commercial Fisheries, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Outdoor Recreation, Geological Survey, National Park Service, 964 pp. printed; Part 2, Department of the Interior, Alaska Railroad, Bureau of Mines, Bureau of Sport Fisheries and Wildlife, Office of Coal Research, Office of Oil and Gas, Office of Saline Water, Office of Territories, Office of the Secretary, Office of the Solicitor, Office of Water Resources Research, 761 pp., printed. Included are testimony, statements and exhibits relating to funds for the Fish and Wildlife Service: the Office of the Commissioner and its two bureaus, Commercial Fisheries and Sport Fisheries and Wildlife.

H. Rept. 1405, Department of the Interior and Related Agencies Appropriation Bill, 1967 (Mar. 31, 1966, report from the Committee on Appropriations, U. S. House of Representatives, 89th Congress, 2nd session, to accompany H. R. 14215), 59 pp., printed. Committee submitted report in explanation of the bill making appropriations for the Department of the Interior and related agencies (includes the U. S. Fish and Wildlife Service and its two Bureaus: Commercial Fisheries and Sport Fisheries and Wildlife) for fiscal year 1967. Contains summary of bill, revenues, summary of increases and decreases, extent of activities funded in bill, and agency by agency discussion of funds requested.

MEMBERSHIP OF COMMITTEE ON MERCHANT MARINE AND FISHERIES: Rep. Casey (Texas) Mar. 8, 1966, submitted his resignation as a member of the House Committee on Merchant Marine and Fisheries. Same day House adopted H. Res. 755, electing Rep. Hathaway (Maine) and Rep. Jones (N.C.) to Committee on Merchant Marine and Fisheries. (Rep. Walter B. Jones was elected to the unexpired term of the late Mr. Bonner.)

MINIMUM WAGE: H.R. 13712 (Dent) introduced in House Mar. 16, 1966, to amend the Fair Labor Standards Act of 1938 to extend its protection to additional employees, to raise the minimum wage, and for other purposes; to Committee on Education and Labor. Similar to H.R. 10275.

NATIONAL SEA GRANT COLLEGES AND PROGRAM ACT OF 1965: H.R. 13482 (Pepper) introduced in House

Mar. 10, 1966, to amend the National Science Foundation Act of 1950, as amended, so as to authorize the establishment and operation of sea grant colleges and programs by initiating and supporting programs of education, training, and research in the marine sciences, to facilitate the use of the submerged lands of the Outer Continental Shelf by participants carrying out these programs and for other purposes; to Committee on Science and Astronautics.

NATIONAL WATER COMMISSION ACT: S. 3107 (Jackson and 8 others) introduced in Senate Mar. 21, 1966, to provide for a comprehensive review of national water resource problems and programs, and for other purposes; to Committee on Interior and Insular Affairs. Sen. Jackson pointed out in (Congressional Record, Mar. 21, 1966, pp. 6047-6049), that this bill was submitted by the Bureau of the Budget and would carry out the President's recommendation as stated in his message of Feb. 23 on preserving our national heritage; would provide for the establishment of a seven member commission of distinguished citizens outside of government and would direct them to consider all aspects of present and anticipated national water problems. He inserted in the Record the text of the bill, together with the letter from the Bureau of the Budget explaining the bill.

Introduced in House H.R. 13849 (Aspinall) Mar. 22, 1966, H.R. 13940 (Reinecke) Mar. 23, and H. R. 14151 (Rodino) Mar. 30, to provide for a comprehensive review of national water resource problems and programs, and for other purposes; to Committee on Interior and Insular Affairs.

Rep. Reinecke spoke in the House and pointed out in Congressional Record, Mar. 23, 1966 (p. 6273), that he had introduced an almost identical bill last July (H.R. 9895) but that the several agencies concerned in the executive branch failed to respond to the Committee's request for reports. The bill being introduced came from the executive branch, and the Congressman's sponsorship of it comes from his interest in seeing that the legislation is passed rather than any pride of authorship.

The House received a letter from the Director, Bureau of the Budget, transmitting a draft of proposed legislation to provide for a comprehensive review of national water resource problems and programs, and for other purposes to Committee on Interior and Insular Affairs.

NATURAL RESOURCES CONFERENCE: Sen. Metcalf spoke in the Senate (Congressional Record, Mar. 29, 1966, pp. 6645-6647), concerning the 31st. North American Wildlife and Natural Resources Conference which was held in Pittsburgh, Pa., last week. He stated that the theme of the meeting was "Renewing Our Resources Environment," and that the sessions of the conference devoted attention to, among other things, air and water pollution, natural beauty, and the pressures of urbanization on resources, fish and wildlife. He inserted in the Record the presentation entitled "Are Present Tools Enough?," which was delivered by Dr. Ira N. Gabrielson, president of the Wildlife Management Institute.

OCEANOGRAPHIC AGENCY OR COUNCIL: Senate Apr. 7, 1966 disagreed to House amendments to S. 944, to provide for expanded research in the oceans and the Great Lakes, and to establish a National Oceanographic Council, asked for conference with House, and appointed conferees.

PRESIDENT'S MESSAGE--TRADE AGREEMENT: The President Mar. 14, 1966, transmitted to the Senate a copy of the trade agreement entered into between the United States and Canada on Dec. 17, 1965, covering reestablishment of concessions in the U.S. schedule to the General Agreement on Tariffs and Trade and covering new concessions to be included in such schedule to offset impairment in concessions negotiated with Canada; referred to Committee on Finance.

SUPPLEMENTAL APPROPRIATIONS 2ND, FY 1966: H.R. 14012 (Mahon) introduced in House Mar. 25, 1966, making supplemental appropriations for the fiscal year ending June 30, 1966, and for other purposes. House Committee on Appropriations Mar. 28, 1966, reported (H. Rept. 1349) on H.R. 14012, without amendment; referred to the Committee of the Whole House on the State of the Union. Includes additional funds for the Office of the Commissioner of Fish and Wildlife and the Bureau of Commercial Fisheries.

H. Rept. 1349, Second Supplemental Appropriation Bill, 1966 (Mar. 25, 1966, report from the Committee on Appropriations, U.S. House of Representatives, 89th Congress, 2nd session, to accompany H.R. 14012), 41 pp., printed. Discusses scope and summary of the bill.

The House Mar. 29, 1966, passed H. R. 14012, to make supplemental appropriations for the fiscal year ending June 30, 1966. The House Committee on Appropriations recommended (H. Rept. 1349) an appropriation of $148,000, a reduction of $55,000 below the budget request.

A subcommittee of the Senate Committee on Appropriations began hearings Mar. 29, 1966, on the proposed second supplemental appropriations for fiscal year 1966, received testimony from Harold E. Crowther, Deputy Director, Bureau of Commercial Fisheries, and other Government officials.

Second Supplemental Appropriation Bill, 1966: Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 89th Congress, 2nd session, 612 pp., printed. Includes testimony, statements, and exhibits on additional funds for the Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife.

H. Doc. 383, Supplemental Appropriations for 1966: Communication from the President of the United States, transmitting Proposed Supplemental Appropriations for Various Agencies for Fiscal Year 1966, referred to Committee on Appropriations, House of Representatives, 89th Congress, 2nd Session, Feb. 21, 1966, 21 pp., printed. Includes, among others, additional funds for Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife.

SOVIET TRAWLERS IN U. S. TERRITORIAL WATERS: Sen. Tower inserted in Congressional Record, Mar. 9, 1966 (pp. 5210-5212), an article that was printed in Navy magazine titled, "The Problem of Soviet Trawlers--Frequent Entry Into Our Territorial Waters by These Electronic-Laden Ships Calls for Tit-for-Tat Response by United States..." by Raymond Schuessler.

WATER POLLUTION: H.R. 13562 (Helstoski) introduced in House Mar. 14, 1966, to amend the Federal

Water Pollution Control Act in order to improve and make more effective certain programs pursuant to such act; to Committee on Public Works.

H. R. 13627 (Kupperman) introduced in House, Mar. 15, 1966, to amend section 8 of the Federal Water Pollution Control Act to authorize reimbursement of States and prefinance certain treatment works; to Committee on Public Works.

H.R. 13653 (Cleveland) and H.R. 13655 (Cramer) introduced in House Mar. 15, 1966, to amend Section 8 of the Federal Water Pollution Control Act to authorize reimbursement of States, municipalities, or intermunicipal or interstate agencies that wish to undertake the construction of treatment works in advance of the availability of funds; to Committee on Public Works.

House Committee on Government Operations Mar. 16, 1966, filed a report (H. Rept. 1330) on water pollution control and abatement, without amendment; referred to Committee of the Whole House on the State of the Union.

Sen. Randolph in extension of his remarks inserted in Congressional Record, Mar. 15, 1966 (pp. A1435-A1436), an address delivered Mar. 1, 1966, by Sen. Muskie before the American Water Works Association, Washington, D. C., titled "Water Quality and the National Interest."

Rep. Reinecke inserted in Congressional Record, Apr. 6, 1966 (pp. A2018-A2020), an article that appeared in the Mar. 1966 issue of Engineering and Science, titled "Controlling Ocean Pollution," by Dr. Norman Brooks, professor of civil engineering, California Institute of Technology.

WATER RESOURCE PROPOSALS--FEASIBILITY INVESTIGATIONS: S. 3034 (Jackson) introduced in Senate Mar. 7, 1966, and H. R. 13419 (Aspinall) introduced in House Mar. 9, to authorize the Secretary of the Interior to engage in feasibility investigations of certain water resource development proposals; to Committee on Interior and Insular Affairs. Sen. Jackson inserted in Congressional Record, Mar. 7, 1966 (4875-4876), a letter from Kenneth Holum, Assistant Secretary of the Interior, requesting the proposed legislation and stating the purpose and need for the bill.

The House Mar. 7, 1966, received a letter from the Assistant Secretary of the Interior, transmitting a draft of proposed legislation.

The Subcommittee on Water and Power Resources of Senate Committee on Interior and Insular Affairs held hearings Mar. 28, 1966, on S. 3034, to authorize feasibility investigations of certain water resource development proposals.

WATER RESOURCES RESEARCH: The Subcommittee on Irrigation and Reclamation of House Committee on Interior and Insular Affairs Mar. 17, 1966, met in executive session and approved for full committee action H.R. 3606 (amended), to promote a more adequate program of water research. Similar to S. 22.

House Mar. 21, 1966, received a communication from the President of the United States, transmitting a report of the Committee on Water Resources Research of the Federal Council for Science and Technology; to Committee on Interior and Insular Affairs.

Sen. Jackson inserted in Congressional Record, Mar. 21, 1966 (p. 6049), the letter from President Johnson transmitting a long-range water research report by the Committee on Water Resources Research of the Federal Council for Science and Technology.

Sen. McGovern inserted in Congressional Record, Mar. 21, 1966 (pp. 6095-6101), a statement by Sen. Anderson on the annual report of the Office of Water Resources Research, together with the letter of transmittal by the Secretary of the Interior.

House Committee on Interior and Insular Affairs, Mar. 23, 1966, met in open session and ordered reported favorably to the House H. R. 3606 (amended), to promote a more adequate national program of water research.

House Committee on Interior and Insular Affairs, Mar. 26, 1966, reported (H. Rept. 1350), with amendment H. R. 3606, to promote a more adequate national program of water research; referred to Committee of the Whole House on the State of the Union.

H. Rept. 1350, Promoting a More Adequate National Program of Water Research (Mar. 26, 1966, report from the Committee on Interior and Insular Affairs, U. S. House of Representatives, 89th Congress, 2nd session, to accompany H. R. 3606), 14 pp., printed. Committee reported bill favorably with amendments. Discusses purpose, major provisions of the bill, and changes in existing law.

The Senate Mar. 29, 1966, received a communication from the President, transmitting a report entitled "A 10-Year Program of Federal Water Resources Research" (with an accompanying report); to Committee on Interior and Insular Affairs.

The House Mar. 30, 1966, adopted H. Res. 801, providing for the consideration of and 1 hour of debate on H.R. 3606, to promote a more adequate national program of water research. The House then passed H. R. 3606. This passage was subsequently vacated and S. 22, a similar bill, was passed in lieu after being amended to contain the House-passed language. Several Representatives made remarks from the floor when considering the bill. Rep. Quillen pointed out in Congressional Record, Mar. 30, 1966 (pp. 6801-6802), that the purpose of H. R. 3606 is to improve current research programs in the field of water resources by amendment of the Water Resources Research Act of 1964 to provide authority to undertake a program of research into all aspects of water problems under the control of the Department. He stated that under H. R. 3606, research grants and contracts on a matching or other basis are provided for State agencies, universities, firms, and individuals working in the field; and authorizes $85 million over a 10-year period.

Senate Apr. 5, 1966, concurred in the House amendment to S. 22, to promote a more adequate program of water research; thus clearing the bill for the President's signature.

WORLD HUNGER: H.R. 13667 (Tupper), to promote international trade in agricultural commodities to combat hunger and malnutrition, to further economic development, and for other purposes; to Committee on Agriculture.

Sen. Tydings inserted in Congressional Record, Mar. 22, 1966 (p. 6193-6195), a statement submitted by Sec-

retary of State, Dean Rusk, before the Senate Committee on Agriculture and Forestry, March 7, 1966, supporting S. 2933.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL--3 "Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, Bureau of Commercial Fisheries, U. S. Department of the Interior, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.

PROGRAM TO SAVE RARE ARIZONA TROUT

A program to save the rare native Arizona (or Apache) trout is being stepped up. Sponsored jointly by the U. S. Interior Department's Bureau of Sport Fisheries and Wildlife, Arizona and New Mexico fishery agencies, the Bureau of Indian Affairs, and the Apache tribe, the program is designed to protect the habitat of the fish and, if necessary, to increase its numbers by artificial propagation.

Once the Arizona trout was found in 360 miles of stream. Today the survivors can be found only in two small mountain streams--Ord Creek and the upper end of the White River's East Fork--on the 1,664,872-acre Fort Apache Reservation in east-central Arizona. The landlords are about 4,000 Apaches, who are cooperating in the effort to save the rare fish.

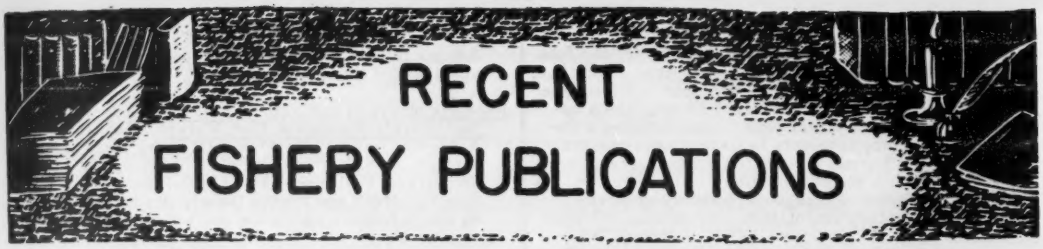
The Arizona trout is much smaller than the non-native rainbow and the Yellowstone cutthroat, which have been stocked in downstream waters. The small size of its two streams, and the resulting scarce food supply, has limited the average size of the fish to 5 to 6 inches, though it may reach 16 inches. Its back is a dark olive green and its belly and sides yellow gold. The yellow-gold color is always present in the pure strain and is often present in hybrid strains. It has minute scales and its spots are black and sharp; many of the spots are circled.

The Arizona trout spawns in March and April. The female lays between 200 and 600 eggs. Its nesting is similar to that of the rainbow trout. The female digs a "redd"--a shallow, round depression in gravel under running water. As she drops the eggs, the male, who is at her side, fertilizes them. The eggs are then covered with gravel and incubation begins. This requires 5 to 6 weeks, then the fry hatch, rise from under the gravel and begin searching for their food--small organisms in the stream.

In the summer of 1964, the White Mountain Apache Tribe and the Bureau of Indian Affairs asked the Bureau of Sport Fisheries and Wildlife to study the Arizona native trout and recommend a program to save it. A Bureau biologist studied the problem and recommended that 15-foot vertical dams be built on the two streams to prevent the upstream migration of competing fish--and that the water upstream of the barriers be restocked with the Arizona native trout.

He suggested, too, that a small lake be constructed where the trout would be able to maintain its own population by spawning in a live stream feeding the lake. If hatchery propagation becomes necessary or desirable, the lake would be a good source of eggs.

Eventually, the Arizona native trout will be given a scientific name and, together with the Gila trout (Salmo gila), may be brought back from the edge of extinction. The need is urgent. Both rare fish are presently at the mercy of an act of nature or man: a forest fire, a natural catastrophe, or a pesticide could destroy them. But, if things go according to plans for the next few years, there may even be limited fishing again for the two trout.



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SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number Title

CFS-3973 - North Carolina Landings, October 1965, 4 pp.
CFS-3974 - South Carolina Landings, September 1965, 3 pp.
CFS-3980 - Frozen Fishery Products, November 1965, 8 pp.
CFS-3982 - Maryland Landings, September 1965, 4 pp.
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CFS-4055 - Packaged Fishery Products, 1965 Annual Summary, 5 pp.
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CFS-4057 - Canned Fishery Products, 1965 Annual Summary, 17 pp.
CFS-4058 - California Landings, November 1965, 4 pp.
CFS-4059 - Fish Sticks, Fish Portions, and Breaded Shrimp, 1965 Annual Summary, 4 pp.
CFS-4061 - Maine Landings, December 1965, 4 pp.
CFS-4062 - Shrimp Landings, November 1965, 5 pp.
CFS-4063 - Massachusetts Landings, September 1965, 9 pp.
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CFS-4065 - California Landings, December 1965, 5 pp.
CFS-4067 - Massachusetts Landings, November 1965, 9 pp.
CFS-4068 - Fish Meal and Oil, January 1966, 2 pp.
CFS-4072 - Louisiana Landings, December 1965, 3 pp.
CFS-4073 - Rhode Island Landings, December 1965, 3 pp.
CFS-4076 - Florida Landings, January 1966, 8 pp.

Sep. No. 760 - Alaska Shrimp Explorations, 1962-64.

Sep. No. 761 - Gear and Technique of the Sea Bass Trap Fishery in the Carolinas.

FL-588 - List of Fishery Cooperatives in the United States, 1964-65, by Leslie D. McMullin, 16 pp., printed, August 1965. Includes names and addresses of fishery cooperatives throughout the United States. Gives in most instances the name of one of the officers of the coop, number of members, number of boats owned by members, type of each cooperative, and the major species of fish and shellfish caught.

SSR-Fish. No. 522 - Pelagic Fur Seal Investigations, 1964, by Clifford H. Fiscus and Hiroshi Kajimura, 52 pp., illus., Nov. 1965.

SSR-Fish. No. 524 - Stream Catalog of Southeastern Alaska, Regulatory District No. 9, edited by Norman Johnston, 199 pp., illus., Sept. 1965.

SSR-Fish. No. 525 - Comparative Study of Juvenile American Shad Populations by Fin Ray and Scute Counts, by Paul R. Nichols, 13 pp., Feb. 1966.

Annual Report Exploratory Fishing and Gear Research, Bureau of Commercial Fisheries, Region 2, for Fiscal Year 1964, by Harvey R. Bullis, Jr. and John R. Thompson, Circular 236, 61 pp., illus., Jan. 1966. Includes a report of the base director, outlining the significant events in exploratory fishing which occurred during the fiscal year. Also includes a resume of accomplishments in fishery development made by the Bureau's research vessel Oregon, the Gulf of Mexico exploratory fishing and gear research program, Pascagoula; offshore gear research, photoinstrumentation, Pascagoula; off-season menhaden explorations--Gulf of Mexico, Pascagoula; Caribbean and tropical Atlantic exploratory fishing and gear research program, Pascagoula; and faunal survey program, Pascagoula. Also covers the South Atlantic exploratory fishing and gear research program, Brunswick; gear research program, Panama City, Panama; and BCF/AID Panama spiny lobster project, Panama City, Panama.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, February 1966, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

List of Primary Receivers of Imported Fishery Products and Byproducts, New York, 1965, 23 pp., 1966. (U. S. Bureau of Commercial Fisheries, Market News Service, 346 Broadway, New York, N. Y. 10013.)

Middle Atlantic Fishery Trends--Monthly Summary--January 1966, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, Room 1003, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; landings at Fulton Fish Market docks and Stonington, Conn.; and trends in the fisheries of the New Jersey and Delaware Bay areas; for the month indicated. This publication succeeds New York City's Wholesale Fishery Trends.

New England Fisheries--Monthly Summary--February 1966, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

Receipts of Fresh and Frozen Fishery Products at Baltimore's Wholesale Fish Market, 1965, by James A. Coyne, April 1966, 30 pp. (Fishery Market News Service, U. S. Fish and Wildlife Service, 103 South Gay Street, Baltimore, Md. 21202.) Includes arrivals of fresh and frozen fishery products receipts on the Baltimore wholesale market as reported by original receivers. Excluded are local cold-storage withdrawals, direct shipments to hotels, restaurants, and retailers, and imports entered by steamship at Baltimore. Receipts are listed by states and countries from which they were shipped. In cases where the shipping point is unknown, they are shown by the state from which they were billed.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, February 1966, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 New Federal Office Bldg. 909 First Ave., Seattle, Wash. 98104.) Includes landings by the halibut fleet reported by the Seattle Halibut Exchange; salmon fleets reported by primary receivers; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels; receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines; and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

Seattle, Washington, Brokers, Importers and Exporters of Fishery Products, 1966, 7 pp., 1966. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

Fish, Wildlife, and Pesticides, 12 pp., illus., printed, 10 cents. Discusses many of the most commonly known pesticides and the purposes for which they are used. Reports on research by Fish and Wildlife Service scientists to assess various pesticides and to develop substitutes for those found to be most dangerous to fish and wildlife. The report also discloses that pesticides can be found virtually everywhere in the world, sometimes thousands of miles from where they were applied. It explains how groups of living organisms rate on a scale of sensitivity to pesticides and how pesticides kill or injure these organisms. It also tells how pesticides are particularly significant to the fishing industry since some of the most valuable species of fish and shellfish are among the most sensitive to pesticides.

Top O' the Mornin' with Fish and Shellfish, Test Kitchen Series No. 15, 19 pp., illus., printed, 1966, 25 cents. Nutritionists agree that one-fourth to one-third of our daily food requirements should be eaten at the morning meal; however, large groups of our population still do not take the time to eat a good

breakfast. A lack of protein in the morning meal no doubt accounts for the mid-morning letdown many experience. Researchers have found this letdown to be a characteristic aftermath of meals which are high in carbohydrates and low in high-quality proteins. Fish is a high-quality protein food abundantly supplied with vitamins and minerals; it cooks quickly and has a delicate, distinctive flavor. This booklet contains 17 "change-of-pace" eye-opener recipes developed by home economists of the Bureau of Commercial Fisheries. They will encourage your family to eat a hearty first-meal-of-the-day. Three of the recipes "Brunch for a Bunch," list ingredients for 25, 50, and 100 portions.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AMINO ACIDS:

Articles from Chemical Abstracts, vol. 61, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"Fish and fish products. IV--Evaluation of certain types of fish for their valuable constituents and essential amino acids," by M. Qudrat-i-Khuda, Kg. M. Quddusur Rahman, and N. A. Khan, July 6, 1964, Abstract No. 1178e.

"Free amino acids of marine invertebrates," by James S. Kittredge and others, June 8, 1964, Abstract No. 14882a.

ANTIBIOTICS:

Articles from Bulletin of the Japanese Society of Scientific Fisheries, printed. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan:

"Effect of metal ions upon the heat stability and antibacterial activity of Tylosin. I--Results obtained by the cylinder-plate assay method"; and "II--Results obtained by the Turbidimetric assay method," by Toshiharu Kawabata, Kimiyo Shibuya, and Takeshi Suzuki, vol. 31, May 1965, pp. 350-364.

"Heat inactivation of Tylosin included in muscle tissue and method of its prevention," by Tetuo Tomiyama and Etsuko Shiraishi, vol. 31, Apr. 1965, pp. 312-318.

"Studies on the behavior and the effect of some preservatives in fish products. I--Behavior of Tylosin in fish products on the basis of antibacterial action," by Motonobu Yokoseki, Chieko Nemoto, and Keishi Amano, vol. 30, Sept. 1964, pp. 772-777.

"Studies on food preservatives. VIII--Resistance studies on Tylosin," by Tomoaki Okitsu, Toshiharu Kawabata, and Tsuneo Kozima, vol. 31, Mar. 1965, pp. 219-226.

BIOCHEMISTRY:

"Kinetics of the reversible reaction of sperm whale myoglobin with zinc," by John R. Cann, article, Biochemistry, vol. 3, May 1964, pp. 714-722, printed. Biochemistry, Society for Experimental Biology and Medicine, 139th St. and Convent Ave., New York, N. Y. 10027.

"The oxygen equilibrium of some lamprey hemoglobins," by Eraldo Antonini and others, article, Archives of Biochemistry and Biophysics, vol. 105, May 1964, pp. 404-408, printed. Archives of Biochemistry and Biophysics, c/o Academic Press, Inc., 111 5th Ave., New York, N. Y. 10003.

BRAZIL:

"Atividade pesqueira atual no Nordeste Brasileiro" (Actual Fishing Activities in Northeast Brazil), article, Revista Nacional da Pesca, vol. 6, no. 48, January-February 1966, pp. 9-11, illus., printed. Revista Nacional da Pesca, Rua Xavier de Toledo, 210, Caixo Postal: 30.263, São Paulo, Brazil.

"La pesca en el Brasil" (Fishing in Brazil), article, Boletin de Informacion, no. 87, December 1965, pp. 17-19, printed. Sindicato Nacional de la Pesca, Paseo del Prado, 18-20, Madrid, Spain.

CALIFORNIA:

California Fish and Game, vol. 52, no. 1, Jan. 1966, 64 pp., illus., printed, single copy $0.75. Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807. Some of the articles are: "Length frequencies of Pacific hake (Merluccius productus) landed in California through 1964," by E. A. Best and R. J. Nitsos; and "A Greenland halibut, Reinhardtius hippoglossoides (Walbaum) recorded on Southern California," by Jack W. Schott.

The California Marine Fish Catch for 1964, by Edward C. Greenhood and David J. Mackett, Fish Bulletin 132, 45 pp., printed. California Department of Fish and Game, Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.

Fish and Game Code, 1965, 299 pp., printed, 1965. California Department of Fish and Game, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807. Provisions of this code relate to the taking, processing, or use of birds, mammals, fish, mollusks, crustaceans, etc. The section pertaining to commercial fishing covers licensing, vessel registration, etc.; particular varieties of fish such as sardines, anchovies, salmon, lobster, crab, abalones, clams and other mollusks, salt-water and anadromous fish, and fresh-water fish. It also covers nets for particular varieties of fish, and other means of taking fish. Inside the back cover are the hunting and angling regulations for 1965, adopted by the Commission under its regulatory powers.

Natural Resources of California, 84 pp., illus., printed, 60 cents. U. S. Department of the Interior, Office of the Secretary, Office of Information, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

Ocean Fishing, 4 pp., illus., printed, 1965. State of California Resources Agency, Department of Fish and Game, 1416 Ninth St., Sacramento, Calif. 95814.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

CLAMS:

"Larval development of the brackish water mactrid clam, Rangia cuneata," by Paul Chanley, article, Chesapeake Science, vol. 6, no. 4, Dec. 1965, pp. 209-213, illus., printed, single copy 75 cents. Natural Resources Institute of the University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. 20688.

"Temperature dependence of the activity of the antitumor factor in the common clam," by Andrew Hegyeli, article, Science, vol. 146, Oct. 2, 1964, p. 77-78, printed. Science, American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

COD:

Articles from Journal of the Fisheries Research Board of Canada, vol. 22, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada:

"Lysolecithinase of cod muscle," by M. Yurkowski and H. Brockerhoff, May 1965, pp. 643-652.

"Studies on the quality of Newfoundland cod. 10--Effect of some commercial freezing rates on the frozen and stored quality of trap cod," by W. A. MacCallum, Dorothy A. Chalker, and E. J. Laishley, March 1965, pp. 411-420; 11--Thaw-drip polyphosphate-treated and untreated fillets," by Dorothy A. Chalker and W. A. MacCallum, May 1965, pp. 783-791.

"Trends in catch, age, and size of cod from the commercial longline fishery at Bonavista, Newfoundland, 1952-62," by A. M. Fleming, March 1965, pp. 465-474.

COMMISSIONS:

Gulf States Marine Fisheries Commission Sixteenth Annual Report, 1964-1965 (to the Congress of the United States and to the Governor and Legislators of Alabama, Florida, Louisiana, Mississippi, and Texas), 47 pp., illus., printed, limited distribution. Gulf States Marine Fisheries Commission, 312 Audubon Bldg., New Orleans, La. 70112. Outlines the Commission's activities for the period October 1964-October 1965, with a summary of actions and recommendations. Describes briefly the activities of each of the member States during that period. Includes short discussions of U. S. Fish and Wildlife Service activities in shellfish, menhaden, bottomfish, and pelagic fish exploration; offshore gear research; faunal survey; shrimp biology, shrimp dynamics, and experimental biology; estuarine studies; pesticides; red tide program; biochemical studies of shrimp; microbiology; seafood inspection and certification; marketing; Federal aid to States; and financial assistance to the commercial fishing industry. Also contains the financial report of the Commission for the year ended June 30, 1965.

16th and 17th Annual Reports of the Pacific Marine Fisheries Commission for the Years 1963 and 1964 (to the Congress of the United States and to the Governors and Legislatures of Washington, Oregon, California, and Idaho), 62 pp., illus., printed, April 1965. Pacific Marine Fisheries Commission, 741 State Office Bldg., 1400 SW. Fifth Ave., Portland, Oreg. 97201. Reports briefly on the specific activities of the Pacific Marine Fisheries Commission during 1963 and 1964 and presents a review of developments in the fields of research, regulation, and coordination in the States of Washington, Oregon, California, and the new member Idaho. Reviews Commission activities during 1963, a few of which are: action on the exploitation by foreign fishing vessels, taking salmon on high seas, shrimp problem between Oregon and California, salmon spawning sanctuaries, power dam moratorium, Indian affairs, pesticide program and other topics. Also reviews Commission activities of 1964, among which are: permanent protection area for anadromous fish in the Salmon River, Idaho; oysters--causes of mortality; shrimp research; and tariff on imported fish regarding international North Pacific Treaty.

CONSUMER PRICE INDEX:

Measuring Prices: An Inexact Science, by Arthur M. Ross, 2 pp., printed. (Reprinted from The Wall Street Journal, Thursday, Feb. 10, 1966.) U. S. Department of Labor, Bureau of Labor Statistics, Washington, D. C. 20210.

CRABS:

"Hemolymph calcium fluctuations as related to environmental salinity during ecdysis of the blue crab, Callinectes sapidus," by Paul A. Haefner, Jr., article, Chemical Abstracts, vol. 61, Oct. 26, 1964, Abstract No. 11071e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Record crab yield paves way for vigorous market push," by Duane D. Shelton, article, Quick Frozen Foods, vol. 17, Mar. 1965, pp. 85-89, printed. Quick Frozen Foods, 1776 Broadway, New York, N. Y. 10019.

"A study of the hatching process in aquatic invertebrates. XX--The blue crab, Callinectes sapidus, Rathbun; XXI--The nemertean, Carcinonemertes carcinophila (Kölliker)," by Charles C. Davis, article, Chesapeake Science, vol. 6, no. 4, Dec. 1965, pp. 201-208, illus., printed, single copy 75 cents. Natural Resources Institute of the University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. 20688.

CUBA:

"Nuevos horizontes en la pesca del bonito" (New Horizons in Bonito Fishing), article, Mar y Pesca, vol. 6, March 1966, pp. 4-11, illus., printed. Instituto Nacional de la Pesca, Amargura 103, Havana, Cuba.

CZECHOSLOVAKIA:

Articles from Bulletin, vol. 1, no. 3, July-September 1965, printed in Czech. Fisheries Research Institute, Vodnan, Czechoslovakia:

"Further new experiences on the use of antibiotics in our fishery," by Josef Havelka and Frantisek Volf, pp. 12-20.

"Application of herbicides for the killing of aquatic plants," by Miroslav Vejvoda, pp. 21-27.

"The newly built experimental ponds of Fisheries Research Institute as a base for solving research tasks," by Rudolf Berka and Emanuel Eliasek, pp. 33-35.

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DOGFISH:
Occurrence of Spiny Dogfish (Squalus acanthias), and Other Elasmobranchs in South Carolina Coastal Waters, 1 pp., printed. (Reprinted from Copeia, no. 3, Sept. 30, 1965, p. 378.) American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif. 91324.

ECOLOGY:
Articles from Ecology, vol. 46, no. 6, Autumn 1965, illus., printed. Duke University Press, P. O. Box 6697 College Station, Durham, North Carolina 27708:

"Vertical zonation of inshore fishes in the upper water layers of the Hawaiian Islands," by William A. Gosline, pp. 823-831.

"Respiration and some phosphorus excretion in some marine populations," by Masako Satomi and Lawrence R. Pomeroy, pp. 877-881.

"Chronic exposure of blue crabs, Callinectes sapidus, to sublethal concentrations of DDT," by Jack I. Lowe, pp. 899-900.

FISH MEAL:
"Possible interference of fats, carbohydrates, and salts in amino-acid determinations in fish meals, fish protein concentrates, and mixed animal feeds," by Preston Smith, Jr., M. E. Ambrose, and G. M. Knobl, Jr., article, Journal of Agricultural and Food Chemistry, vol. 31, May-June 1965, pp. 266-268, printed. Journal of Agricultural and Food Chemistry, The American Chemical Society, 1155 - 16th St. NW., Washington, D. C. 20006.

FISH MORTALITIES:
Catastrophic Fish Mortalities on Kentucky Lake, 8 pp., processed, Nov. 1965. The Executive Secretary, Tennessee Stream Pollution Control Board, 620 Cordell Hull Bldg., Nashville, Tenn. 37219.

FISH OIL
"Absorptive bleaching and molecular distillation of menhaden oil," by E. J. Gauglitz, Jr., and E. H. Gruger, Jr., article, Journal of the American Oil Chemists' Society, vol. 42, June 1965, pp. 561-563, printed. American Oil Chemists' Society, 35 E. Wacker Dr., Chicago, Ill. 60601.

"Biological availability of calcium and phosphorus in menhaden fish oils," by A. H. Spandorf and K. C. Leong, article, Poultry Science, vol. 44, July 1965, pp. 1107-1113, printed. Poultry Science Association, Kansas State University, Manhattan, Kansas 66504.

"Studies of the distributions of lipids in hypercholesteremic rats. 3--Changes in hypercholesteremia and tissue fatty acids induced by dietary fats and marine oil fractions," by James J. Peifer and others, article, Archives of Biochemistry and Biophysics, vol. 110, May 1965, pp. 270-283, printed. Archives of Biochemistry and Biophysics, c/o Academic Press, 111 5th Ave., New York, N. Y. 10003.

FISH POPULATIONS:
An Analysis of the Variability of Fish Populations Taken by Otter Trawl in Biscayne Bay, Florida, by Martin Roessler, Contribution No. 594, 8 pp., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 94, no. 4, Oct. 1965, pp. 311-318.) The Marine Laboratory, Institute of Marine Science, University of Miami, Miami, Fla. 33124.

FISHWAYS:
"Fish, Wildlife, and Water Development," by J. C. Fraser, article, Outdoor California, vol. 27, no. 2, Feb. 1966, pp. 3-5, 14, illus., printed, annual subscription $2.00. Outdoor California, State of California, Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.

FREEZE-DRYING:
"Browning of freeze-dried fish," by H. L. A. Tarr and R. E. A. Gadd, article, Journal of the Fisheries Research Board of Canada, vol. 22, May 1965, pp. 755-760, printed. Queen's Printer, Ottawa, Canada.

FRESH-WATER FISH:
"Some pan fishes of New York--yellow perch, white perch, white bass, freshwater drum," by Edward C. Raney, article, The Conservationist, vol. 10, no. 3, 1965, pp. 22-28, printed. The Conservationist, New York State Conservation Dept., Albany, N. Y.

FROZEN FISH:
"Puff-type batter coating creating profitable market for deep-fry frozen food," article, Quick Frozen Foods, vol. 27, June 1965, pp. 117-120, printed. Quick Frozen Foods, 1776 Broadway, New York, N. Y. 10019.

GEAR:
"Adjusting ship-type with gear handling in stern trawler design," by Conrad Birkhoff, article, The South African Shipping News and Fishing Industry Review, vol. 20, no. 9, Sept. 1965, pp. 100-103, illus., printed, single copy 30c. (about US$0.45). Thomson Newspapers, South Africa (Pty.) Ltd., Thibault Sq., Box 80, Cape Town, South Africa Republic.

GENERAL:
The Common Wealth in Ocean Fisheries, by Francis T. Christy and Anthony Scott, 294 pp., printed, 1965, $6.00. The Johns Hopkins Press, Baltimore, Md. 21218. The authors examine the fishery resources of international waters, pointing out that intense competition can lead to conflict between nations, depletion of resources, and wastage of capital and labor. The first part of the book discusses the common property aspects of fisheries and reviews the potential physical productivity of the oceans, and on the supply and demand situation which is likely to develop for ocean products. The remainder of the book examines the legal principles that guide the present use of the seas and concludes that new practices and regulations are called for if the world's fisheries are to be developed in an orderly and rational fashion.

GERMAN FEDERAL REPUBLIC:
Informatione für die Fischwirtschaft (Information for the Fishing Industry), vol. 12, no. 4/5, 1965, 53 pp., processed in German. Includes among others, these articles: "Such-und Forschungsreise mit FFS 'Walther Herwig'--10. Reise" (Exploratory and Research Trip of the FFS "Walther Herwig"--10th Trip): "Bericht über die 88. Reise des FFS 'Anton Dohrn' nach Labrador und Westgrönland" (Report on the 88th

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trip of the FFS "Anton Dohrn" to Labrador and West Greenland); "Überblick über die deutsche Heringsfischerei 1964" (Review of the German Herring Fishery 1964); "Neue Ergebnisse aus der internationalen Forschung über den Roten Thun" (New Findings from the International Research on Red Tuna); and "Methoden der Qualitätsbeurteilung tiefgefrorener Fischerzeugnisse" (Methods of Determining Quality of Deep Frozen Fishery Products).

HALIBUT:

"Chalkiness in halibut in relation to muscle pH and protein denaturation," by N. Tomlinson, S. E. Geiger, and E. Dollinger, article, Journal of the Fisheries Research Board of Canada, vol. 22, May 1965, pp. 653-663, printed. Queen's Printer, Ottawa, Canada.

ICHTHYOLOGY:

Copeia, No. 4, Dec. 31, 1965, 175 pp., illus., printed. American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif. 91324. Includes, among others, articles on: "Osteology of the Zoarcid fish Melanostigma pammelas," by Edgar L. Yarberry; "A Review of the razorfish genus Hemipteronotus (Labridae) of the Atlantic Ocean," by John E. Randall; "Cubiceps athenae, a new nomeid fish from the western North Atlantic Ocean, and its systematic position among stromateoids," by Richard L. Haedrich; and "Ichthyological notes: New locality records for Alaskan fishes."

IRRADIATION PRESERVATION:

"Irradiation preservation of Pacific Coast fish and shellfish. III - Storage life of petrale sole fillets at 33° and 42° F.," by J. Spinelli and others, article, Food Technology, vol. 19, June 1965, pp. 126-130, printed, single copy $1.50. Food Technology, Institute of Food Technologists, Suite 1350, 176 N. Adams St., Chicago, Ill. 60603.

Radiation Processing of Foods (Hearings before the Subcommittee on Research, Development, and Radiation of the Joint Committee on Atomic Energy, Congress of the United States, Eighty-Ninth Congress, 1st session, June 9 and 10, 1965), 826 pp., illus., printed, $2.50. The Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Contents include statements and correspondence from various Federal Officials, doctors, and representatives of business firms. It includes, among others, a report on "Marketing feasibility study of radiation processed fishery products"; and "Irradiation nears reality--pilot plant will pioneer processing, shipping, and marketing of irradiated seafoods." Fish meal is included in the study of the economics of controlling Salmonellae in foods by the use of ionizing radiation.

"Studies on food irradiation in Japan," article, Food Irradiation Quarterly, vol. 5, no. 3, January-March 1965, pp. A8-A11, printed. Centre Europeen d'Information pour l'Irradiation des Aliments, B. P. No. 6, Gid-sur-Yvette (S. -et-O), France. (For sale by O.E.C.D. Mission, Suite 1223, 1346 Connecticut Ave. NW., Washington, D. C. 20006.)

JAPAN:

Fisheries Census for FY 1964, 181 pp., printed in Japanese, December 1965. Statistics and Survey Division, Agriculture-Forestry Ministry, Tokyo, Japan.

Fisheries Production Indexes for 1964, 6 pp., processed in Japanese, November 1965. Japanese Fisheries Agency, Tokyo, Japan.

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location. The authors stress, though, that much research is still needed both on this subject of intelligence and on the habits of cetaceans and seals. The references at the end of the book give an extensive list of current, as well as standard books and articles to which the student may refer.

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A Biological Investigation of the Caloosahatchee Estuary of Florida, by Gordon Gunter, Gulf Research Report, vol. 2, no. 1, 72 pp., illus., printed, Dec. 1965. Gulf Coast Research Laboratory, Ocean Springs, Miss.

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Annual Report of the Division of Fish and Game, 62 pp., printed. Department of Conservation and Economic Development, Division of Fish and Game, Trenton, New Jersey. Contains, among others, summary of activities of "Bureau of fisheries management, freshwater research and development section."

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Proceedings of the National Conference on the Concept of a Sea-Grant University, 96 pp., printed, Oct. 28 and 29, 1965, US$4.00. Graduate School of Oceanography, University of Rhode Island, Kingston, R. I. 02881. Contains the speeches, panel discussions, and other proceedings of the National Conference on the "Concept of a Sea-Grant University."

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Know Your Oklahoma Fishes, by Hubert C. Ward, 40 pp., illus., printed. Oklahoma Department of Wildlife Conservation, Oklahoma City, Okla. Describes and illustrates 16 of the known fish families in Oklahoma and about one-third of the species. A brief discussion of each species is also included.

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Gonad Development and Discharge of Spawn in Oysters of Long Island Sound, by Victor L. Loosanoff, 17 pp., illus., printed. (Reprinted from Biological Bulletin, vol. 129, no. 3, Dec. 1965, pp. 546-561.) The Biological Bulletin, The Marine Biological Laboratory, Woods Hole, Mass. 02543.

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No. 1 - Data on the Present Status of Soviet Fisheries, 39 pp.

No. 2 - (A) Data on Soviet 7-Year Fisheries Plan and on Next 5-Year Fisheries Plan; (B) Structure and Capacities of Large-Sized Trawlers, 98 pp., illus.

Prakticheskoe rukovodstvo po bor'be S vrediteliami rybnykh produktov (Practical Guidance in the Control of Pests Harmful to Fishery Products), by S. A. Dorokhov, 92 pp., printed in Russian, 1965. Izd-vo 'Pishchevaiia Promyshlennost', Moscow, U. S. S. R. The booklet describes modern methods to control insects (flies, beetles, moths), rodents, and other harmful pests in processing fishery products.

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UNITED KINGDOM:
"Fillets or Whole Fish?" article, World Fishing, vol. 15, no. 2, February 1966, pp. 25-27, 31, illus., printed, single copy 3s. 6d. (about 50 U. S. cents). Grampian Press Ltd., The Tower, 229-243, Shepherds Brush Road, Hammersmith, London, W. 6. England. With two new British freezer stern trawlers fitted out for filleting and in commission and more on the way, it seems that Britain may soon follow Germany in the production of sea-frozen fillets by the medium stern trawler. Since this possibility was last considered in World Fishing (January 1962), the practicability of this system has moved closer, though certain problems are not yet fully solved. The article draws on expert opinion to define and discuss these problems as they stand today.

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VIRGINIA:
Sixty-sixth and Sixty-seventh Annual Reports of the Commission of Fisheries of Virginia (for the Fiscal Year Ending June 30, 1964 and June 30, 1965), 40 pp., illus., printed, 1965. Virginia Commission of Fisheries, Newport News, Va. A summary of the functions and operations of the Commission. Shows the amount of revenue derived from the fish and

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shellfish industries and royalties, all the expenditures of the Commission, and the general condition of the fish and shellfish industries under the supervision of the Commission. Discusses enforcement and personnel, working of the engineering department, Potomac River activities, fishery statistical collection, and oyster research. Also covers accomplishments by the Commission in conservation and rehabilitation, pollution control, and James River study. Statistical tables present data showing receipts from the fish and oyster industry by districts; recorded oyster planting grounds; and other related information.

WHITEFISH:

"Candling for the detection of triaenophorus crassus cysts in whitefish," by W. Budde, article, Journal of the Fisheries Research Board of Canada, vol. 22, May 1965, pp. 865-867, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

RADIATION PRESERVATION OF FOOD IS GAINING

The preservation of food by ionizing radiation "is fast approaching commercialization," and within the decade, irradiation will be recognized as a major technique for preservation, the U. S. Department of Commerce said on June 1, 1965.

These conclusions were presented in a report--"Current Status and Commercial Prospects for Radiation Preservation of Food," prepared by the Food Irradiation Unit in the Office of Chemicals and Consumer Products of the Department's Business and Defense Services Administration (BDSA). The BDSA is a member of a 10-member interagency group dealing with radiation preservation of food. The report was prepared under contract for the Atomic Energy Commission, another member.

The report explains that the Food and Drug Administration has cleared radiation-treated bacon, wheat and wheat products, and potatoes for human consumption, as well as a number of packaging materials for use in connection with irradiated foods. Other petitions for clearance are pending or in preparation.

Of the 28 products considered in the study in connection with 6 different irradiation processes, 17 were found to have either "good" or "excellent" prospects for domestic or international markets.

Those products for which radiation is believed to hold the most promise at this time are: pasteurized poultry, marine products, and strawberries; sterilized poultry and ham; improved dehydrated vegetables; and disinfected eggs, liquid, frozen, and dried.

The study also identifies the direction and magnitude of possible changes or problems which may affect segments of the economy concerned with food processing, as adoption of the radiation technique increases.

It also includes an analysis and discussion of international aspects, Government regulation, consumer reaction, and other factors.

The report says that major benefits of this new method of food preservation will be felt in areas not reached by other processes. In some instances, it is expected to replace present methods of preservation, and elsewhere, to be used in combination with other processes.

The benefits anticipated include elimination of food-borne hazards to health; the availability of new and more convenient foods; improvement in quality; savings from reductions in spoilage; and market expansion as the result of extensions of shelf life and shipping distances.

Note: "Current Status and Commercial Prospective for Radiation Preservation of Food" is for sale by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Price 55 cents.

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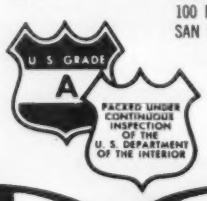
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